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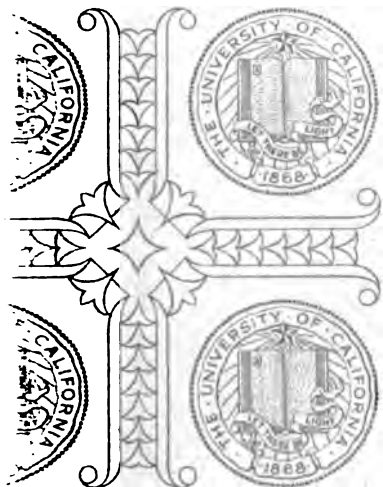
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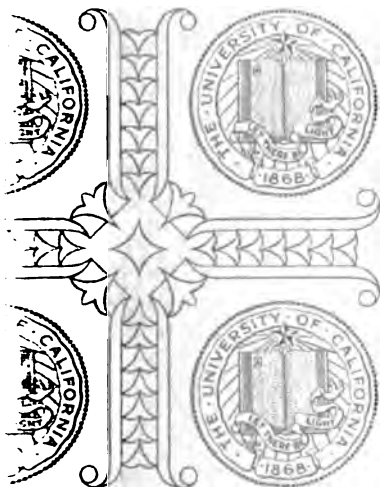
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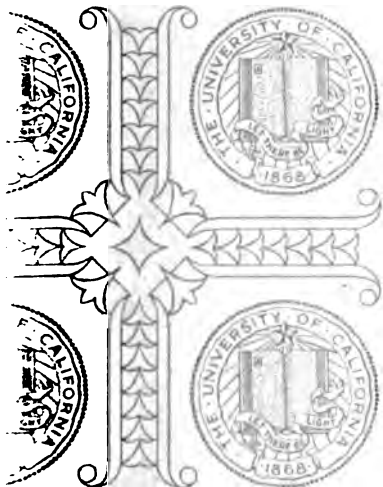
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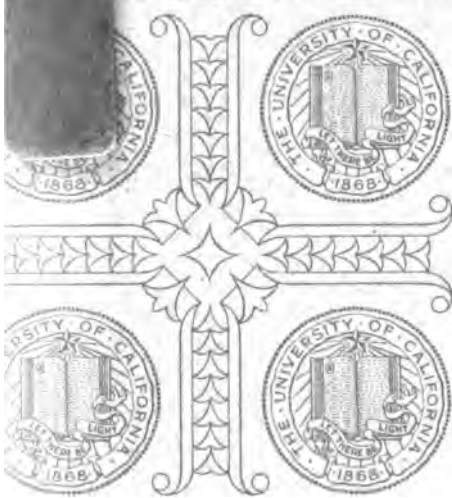
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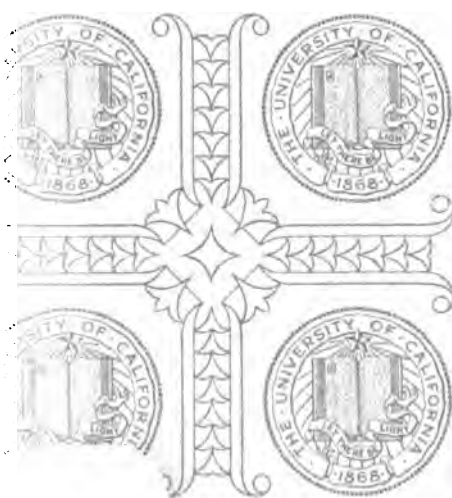
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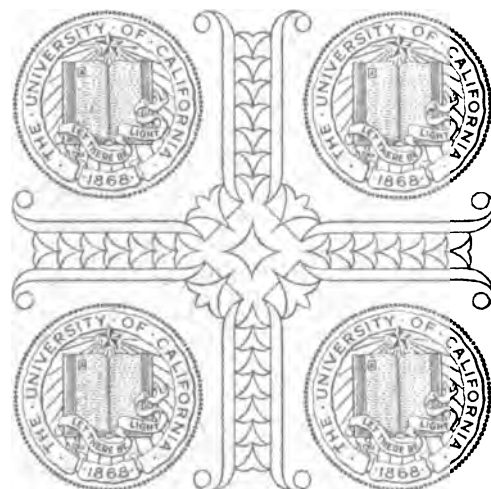


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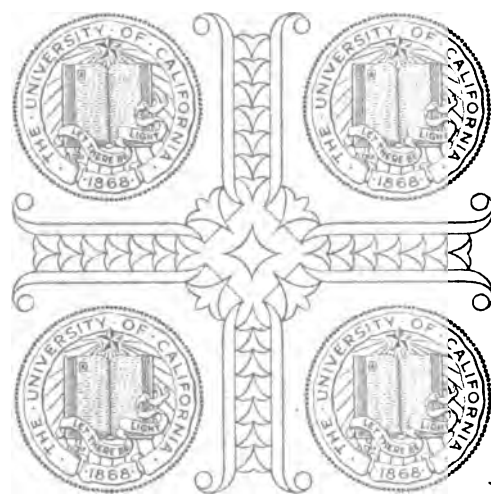


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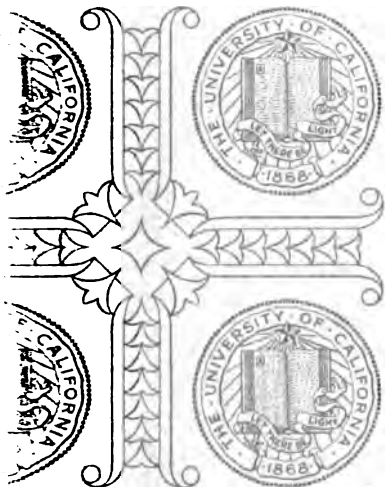
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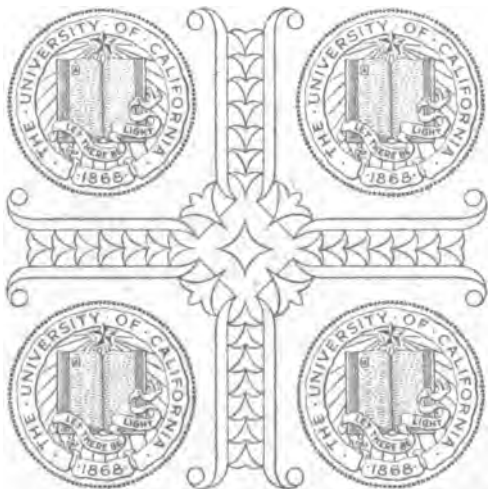
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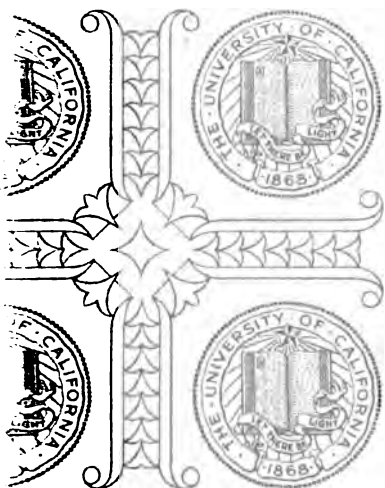
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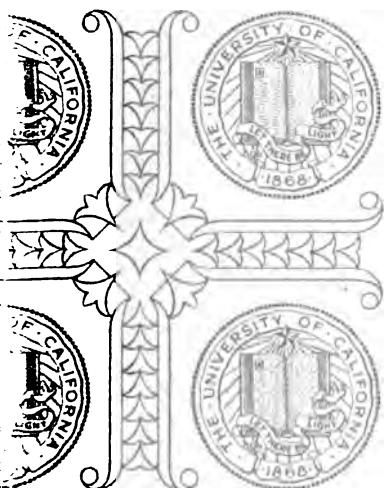
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THE
AMERICAN ANTHROPOLOGIST.

PUBLISHED UNDER THE AUSPICES OF THE
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WASHINGTON, D. C., JANUARY, 1890.

No. 1.

A QUARRY WORKSHOP OF THE FLAKED-STONE IMPLEMENT MAKERS IN THE DISTRICT OF COLUMBIA.*

BY W. H. HOLMES.

In this paper I desire to present a brief account of recent archæological investigations in the suburbs of the city of Washington. The work is yet incomplete, but as winter has put an end to operations in the field it is deemed best that the results thus far obtained should be brought to the attention of archæologists.

Heretofore I have taken little part in the discussion of questions pertaining to local archæology, as the evidence presented did not seem to be conclusive in any direction. The present exploration has been undertaken, therefore, without preconceived notions of what the results should be, and the conclusions are based almost entirely upon facts and arguments pertaining to and derived from my own investigation. Some conclusions of importance have been definitely reached and numerous questions have been answered. Some of the results were unexpected and some may at first seem a little startling, but I am happy to say that every tendency has been toward the simplification of what was in many respects a most perplexing problem.

THE RELICS.

From time to time during the past decade the attention of archæologists has been called to a class of rudely worked stones found in great numbers in the vicinity of this city. They are all shaped exclusively by chipping, and are of forms usually classed as palæolithic, the best-known variety being the so-called "turtle-back;" but other forms of less striking character, although more highly elaborated and interesting, are almost equally numerous.

* Read before the Society Nov. 16, 1889.

So numerous, indeed, are these objects in certain localities that they are brought in with every load of gravel from the creek beds, and the laborer who sits by the way-side breaking bowlders for our streets each year passes them by thousands beneath his hammer; and it is literally true that this city, the capital of a civilized nation, is paved with the art remains of a race who occupied its site in the shadowy past, and whose identity until now has been wholly a matter of conjecture.

PREVIOUS STUDY.

The first discussion of these objects within my memory occurred at a meeting of the Anthropological Society of Washington in the winter of 1878. A paper upon the turtle-backs was read by Dr. W. J. Hoffman, in which their character, manner of occurrence, age, and relations to the Abbott finds of New Jersey were discussed. Later Mr. S. V. Proudfit engaged in the collection and study of these forms, and in 1888 published a short paper relating thereto in the journal of this society. On his return from a long sojourn in Europe in 1887 Mr. Thomas Wilson took the subject up afresh, and has since published short papers upon the general subject of palæolithic man in America, in which allusion is made to the local finds. The most direct and thorough treatment of the subject occurred at a meeting of the Anthropological Society held in the month of April, 1889. In the symposial discussion of the archæology of the District of Columbia, three papers, by W J McGee, Thomas Wilson, and S. V. Proudfit, respectively, bore directly upon these rude objects; but up to the present time no one has essayed more than to study the surface finds, and therefore comparatively little was known of the true character and history of the chipped implements of the region.

SURFACE DISTRIBUTION OF RELICS.

The objects in question are somewhat sparingly scattered over the surface of the country, and are found to some extent upon ancient village sites along the Potomac and its tributaries; but the main deposits, as shown by recent discoveries, occur along the steep faces of the great terraces that surround the city. To these spots the ancient inhabitants resorted to collect the cobble-stones there outcropping and to chip them into desired shapes, and it is to these sites—the ancient workshops—that we must look for light to illumine some of the obscure features of archæologic science.

BEGINNING OF THE WORK.

In July, 1889, at the instance of the Director of the Geological Survey, I resigned my place in that organization to accept a place as archæologist, under the same direction, in the Bureau of Ethnology. It was intended that in the near future I should begin archæological investigations along the Atlantic coast, and I resolved to commence work at home—literally at home—for the nearest site in which these rude implements are found, and one of the most promising sites for archæologic research in the United States, was only one and a quarter miles from my own doorstep in this city.

But, aside from the convenience of the locality, there were other good reasons for beginning the work here. The relics found have a direct bearing upon questions of the early occupation of this country—an occupation believed by many to have preceded that of the Indian. These questions are of the utmost importance and demand the fullest and closest attention, since their study necessarily precedes and introduces the discussion of the general archæology of the Atlantic slope; but, further, these deposits of artificial refuse being of great extent and of unknown depth, the undertaking, to be carried out systematically and thoroughly, involved very considerable expense and seemed beyond the reach of private means.

The site chosen is representative of a class, and will serve in a measure as a key to all. Other localities may present different phenomena and possibly conflicting testimony, and their examination may lead to changes in some of the conclusions drawn from the study of this example; but the lessons here taught are for the most part complete in themselves, and the work as a whole will constitute a nucleus of well-ascertained fact, about which other units of like character will gradually accumulate. The work derives its chief importance from the fact that it is the first exploration in this section of a well-identified quarry workshop of the ancient flaked-stone tool-makers.

LOCALITY.

In passing out of the city by way of Fourteenth street extended, a picturesquely located bridge is crossed at a point one and a third miles from Boundary street. The little stream spanned by this bridge is known as Piny Branch and falls into Rock creek at a little more than half a mile below the bridge.

Arrived at the bridge, we are already within the limits of the im-

plement-bearing area, and the rude objects may be picked up on all sides—in the lanes that lead up through the forest-skirted farm of Mr. Blagden, in the beds of all the streams, and upon all the slopes north and south of the creek, including an area three-fourths of a mile square.

In this investigation we are particularly concerned in a portion of the area on the north side of the creek and just west of the Fourteenth-street road. Here the faces of the plateau rise to 100 feet above the creek bed and 200 feet above tide-water. The slopes are precipitous, but generally even and regular, and are covered with forest, much of which is primeval. A number of small rivulets descend from the plateau through deep ravines into the creek. One of these, coming down from the north, is seen by the road-side at the left, and another, quite obscured from any ordinary point of view by the forest, occurs one-fourth of a mile to the west. Between these two ravines is a promontory or spur of the plateau with a nearly level top 100 yards in width, the steep slopes of which descend to the rivulets on the east and west and to the creek on the south.

Upon these steep slopes the primitive peoples found the material used in implement making, and here they worked, until a mass of refuse of astonishing magnitude had accumulated. This is now found not only upon the slopes, but in the masses of gravel at the base of the slopes and in the flood planes of the valley, even down to Rock creek and for an unknown distance along its course.

DISCOVERY OF SHOP SITES.

Mr. S. V. Proudfit has in past years explored this locality with considerable care, and in the *ANTHROPOLOGIST* of July, 1889, he describes the distribution and character of the relics with accuracy and in some detail.

So far as known, the first discovery of worked stones upon the site of my excavations was made by Mr. De Lancey Gill, who was engaged in sketching upon the bank of the Branch, and by chance observed an implement in the gravel at his feet. Subsequently he came upon a number of heaps of shop refuse in the western ravine at the point now cut by my section.

In September, 1889, I visited Mr. Blagden, owner of the property, to obtain permission to work upon the premises, and learned from him that about the year 1878 a street contractor had been

permitted to collect material for paving from these grounds, and that the piles of refuse found by us were gathered together at that time, a portion only of the heaps collected having been carted away. At that time a narrow roadway was cut leading from the creek up the little ravine to the site of our recent labors. Mr. Blagden subsequently informed me that when yet a boy, some twenty-five years ago, he had observed the great quantities of bowlders at this point, and, desiring to know something of the reasons for their accumulation, had secured help to dig a trench, which was abandoned, however, before the bed of boulder refuse was penetrated. I have no doubt that the evidences of former excavation discovered at the fiftieth foot of my section, and which caused me no little perplexity at the time, is thus fully explained.

SURFACE INDICATIONS OF QUARRY SITES.

In beginning the examination of this site my first step was to observe carefully its topographic features, with especial reference to such eccentricities of contour as might be due to the agency of man.

Extensive working over of *débris*, especially if associated with quarrying, would leave inequalities of surface which, if not afterwards obliterated or greatly reduced by natural forces, would be easily recognized as artificial. Such inequalities were readily found, and so well defined are they that even the casual observer could not fail to detect them. It was partly on account of peculiarities of profile that excavations were undertaken at the spot selected, and the results have shown that these surface indications were not deceptive.

The higher up the gulch we go the more pronounced are the elevations and depressions resulting from the ancient work. Either the disturbances here are more recent than below or the leveling agencies of nature have been less active.

THE EXCAVATION.

I shall not attempt in this place to give a detailed account of the geologic formations of the region, nor shall I refer to the methods of exploration and the interesting but tedious details of excavation. A brief review of those members of the geologic section most intimately associated with the work of man will be sufficient for present purposes, and the diagram here presented, Plate I, will assist in making all my statements clear. The three formations involved are,

first, the mica schists, A, which underlie the whole region and form the bed-rock of the Piny Branch bluff up to within perhaps forty feet of the summit. Second, the sedimentary gravels, sands, clays, and boulder beds, B, lying horizontally upon the schists and forming the bed-rock of the upper forty feet of the slopes. These belong to the Potomac formation of Mr. McGee and are of Mesozoic age. Third, the over-placed cloak of soil and gravel, C, derived from the above fundamental formations and completely covering them. It is with these latter beds that the student of human history is chiefly concerned. At the point cut by the section these gravels are separable into three important but not always clearly definable groups, which may be designated as follows: 1st, the pre-artificial, C¹; 2d, the artificial and inter-artificial, C²; 3d, the post-artificial, C³.

The pre-artificial gravels, C¹, consist of detritus derived from the outcropping edges of the underlying formations and spread over the surface before this site was occupied. These are therefore free from artificial remains.

The artificial deposits, C², consist of beds and masses of *débris* obtained from surface gravels and from the Potomac beds beneath by men quarrying for boulders, the raw material used in the manufacture of stone implements. These masses of refuse, worked over and rearranged by the hand of man, alternate in a rude way with layers of material that appear to have been redistributed to a certain extent by natural forces during intervals separating seasons or periods of human activity.

The post-artificial deposits, C³, consist of surface detritus rearranged by natural forces anterior to the period of human occupation, and consist of gravel, loam, shop refuse, and vegetable mold. They form but a thin sheet, save in the flood plain of the rivulet, where they have accumulated in places to eight or ten feet in thickness. They contain numerous relics from the workshops throughout the large area examined, and upon the middle part of the slope cut by my section the relics and shop refuse are amazingly prevalent, forming, perhaps, one-fourth of the entire mass.

Now at the point cut by this section small portions only of the pre-artificial-slope gravels remain in their normal condition. The principal parts remaining are near the lower and upper ends of the cutting, where the ancient workman left them undisturbed. Other small portions probably remain upon the uneven edges of the schists

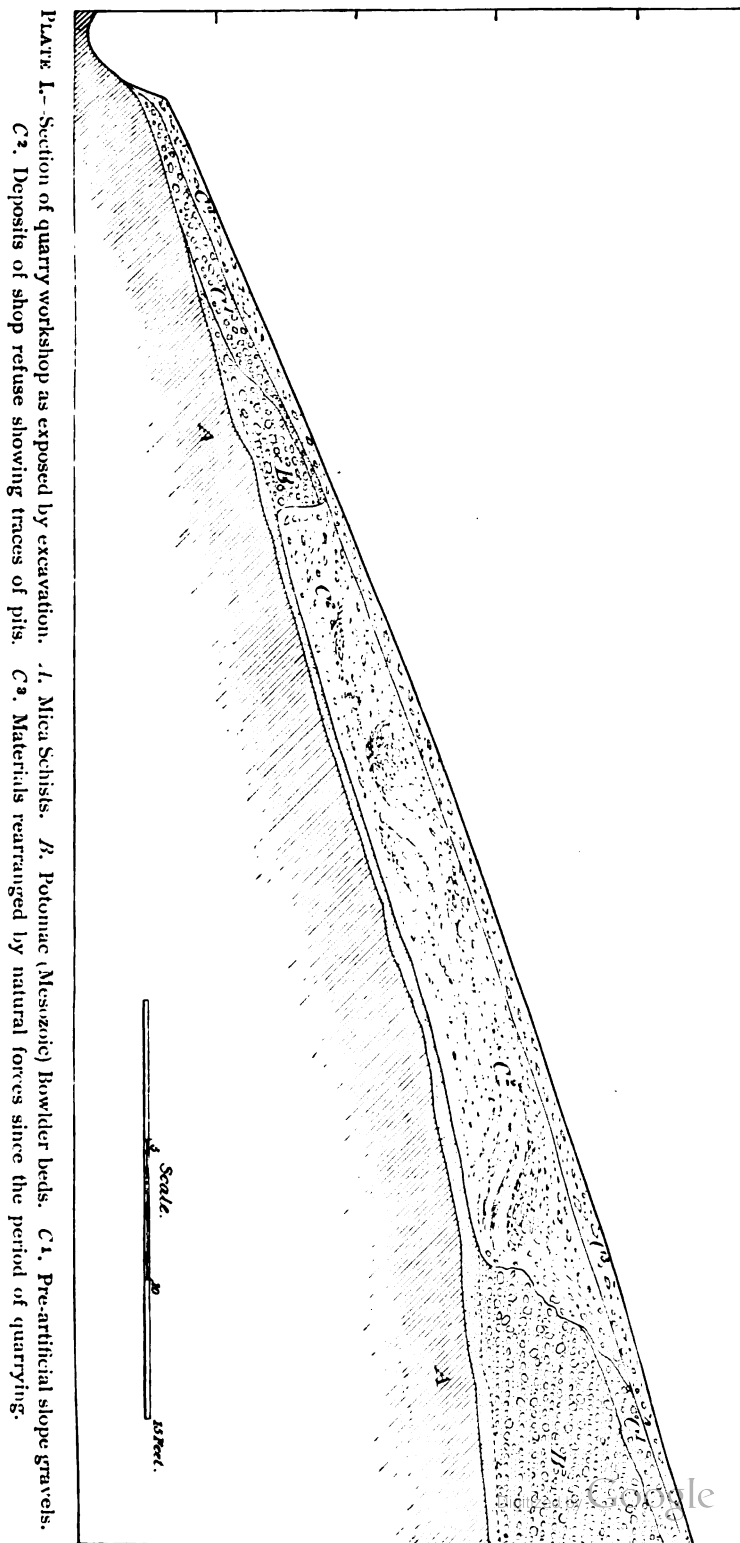


PLATE I.—Section of quarry workshop as exposed by excavation. *A*, Mica Schists. *B*, Potomac (Mesozoic) Boulder beds. *C1*, Pre-artificial slope gravels. *C2*, Deposits of shop refuse showing traces of pits.

and upon the mesozoic beds at points where the cobble-diggers did not wholly penetrate them. We have no means of determining with precision the original thickness of this deposit at points where artificial disturbance has taken place. The condition of the remnants above and below indicate that the surface, when man first appeared to gather cobbles, was not greatly different from that of the present day. Additional reasons for this conclusion may be given: First, there can have been little reduction of the mass of the hill, because the artificial formations remain upon the slope, and that so completely that evidences of heaping up and excavation are not wholly obliterated; and, second, there is no possible way of elevating the profile by natural means, since there is but a meager mass of material above to draw from; besides, if filling had occurred, the artificial profile would have been obliterated as surely as by degradation.

Adopting the assumption, therefore, that the profile of the hill and the general relations of the principal members, A, B, C, of the section were the same when man first appeared as they are now, let us briefly note the work accomplished by his hands: Throughout all the unnumbered years that have elapsed since this little valley was definitely outlined, the formations of the upper slopes, including the boulder beds, have been disintegrating and sliding or rolling down toward the rivulet. My examination has shown that the boulders lodged in numbers at all levels, and thus became imbedded in the slope gravels; but it is probable that the boulders were more numerous than elsewhere below and near the immediate base of the outcrop from which they were derived—that is to say, about midway in the slope. Howsoever this may be, it now appears that the boulder-hunter has worked over this part of the slope, and that millions of worked stones and unshaped fragments now occupy the site.

In cutting the section from below, the first positive evidence of ancient excavation was encountered at about the twenty-fifth foot, and from this to the fortieth foot this work had reached five feet in depth beneath the present surface. At the fiftieth foot it had reached five and one-half feet, and at the sixtieth foot it was six feet deep and had penetrated the gravels and the Potomac beds beneath to within one foot of the underlying mica schist. At the seventieth foot the overlying formations had been entirely penetrated, and the ancient workman stood upon the mica schist, nine feet below the surface, and there shaped his rude stone tools. At the seventy-ninth foot

we encountered the face of the Potomac boulder bed, an uneven wall some ten feet in height, composed of ovoid quartzite boulders, many of which are wonderfully adapted to the hand of the stone-age tool-maker. They are firmly imbedded in a matrix of argillaceous sand. Here was the quarry face of the ancient miner. Facing a wall like this, he was in a position to supply the whole ancient world with the raw material for one of its most important arts.

Now the analysis of the phenomena here encountered has been made with the utmost care, and I have called upon our foremost scientists to witness every feature of interest.* First in importance are the evidences of deep quarrying. In the vertical walls of our excavation the sloping sides of the ancient pits are clearly defined by layers of differently colored earths, and the beds and masses of refuse from the workman's hands are not changed in their relations and hardly changed in their appearance since the day they were deposited. Masses of shop refuse were encountered at every step of the excavation and had the appearance of pockets, as shown in the section, Plate II, which represents the front wall of the trench at the seventy-fifth foot.

The lower pocket of refuse shown in this section was eight feet below the surface and rested almost upon the surface of the schists. It had been thrown against one side of the pit-bottom, and was upward of two feet in depth. It consisted of boulders, whole and broken, and fragments in all stages of manufacture, including numerous well-shaped forms and many chips.

A remarkable feature of this pocket of shop refuse was the openness of its interspaces. Animals as large as rats could have entered the openings and meandered the subterranean passages with ease. This feature is well shown in Plate III. Upon this loose heap of debris irregular layers of earth and gravel containing a few boulders were superimposed, and upon these again another bed of artificial refuse, of great extent and thickness, had been thrown. The position and nature of this bed is shown in the middle part of the section. Here both rude and well-shaped relics of art were very numerous, and flakes and fragments were innumerable. The walls of the pit in which they accumulated are clearly defined to a height of six feet.

* Mr. W J McGee took exceptional interest in the work and his advice and assistance have been of the greatest service. It is gratifying to be assured of his concurrence in my conclusions regarding the quarries and quarry products.

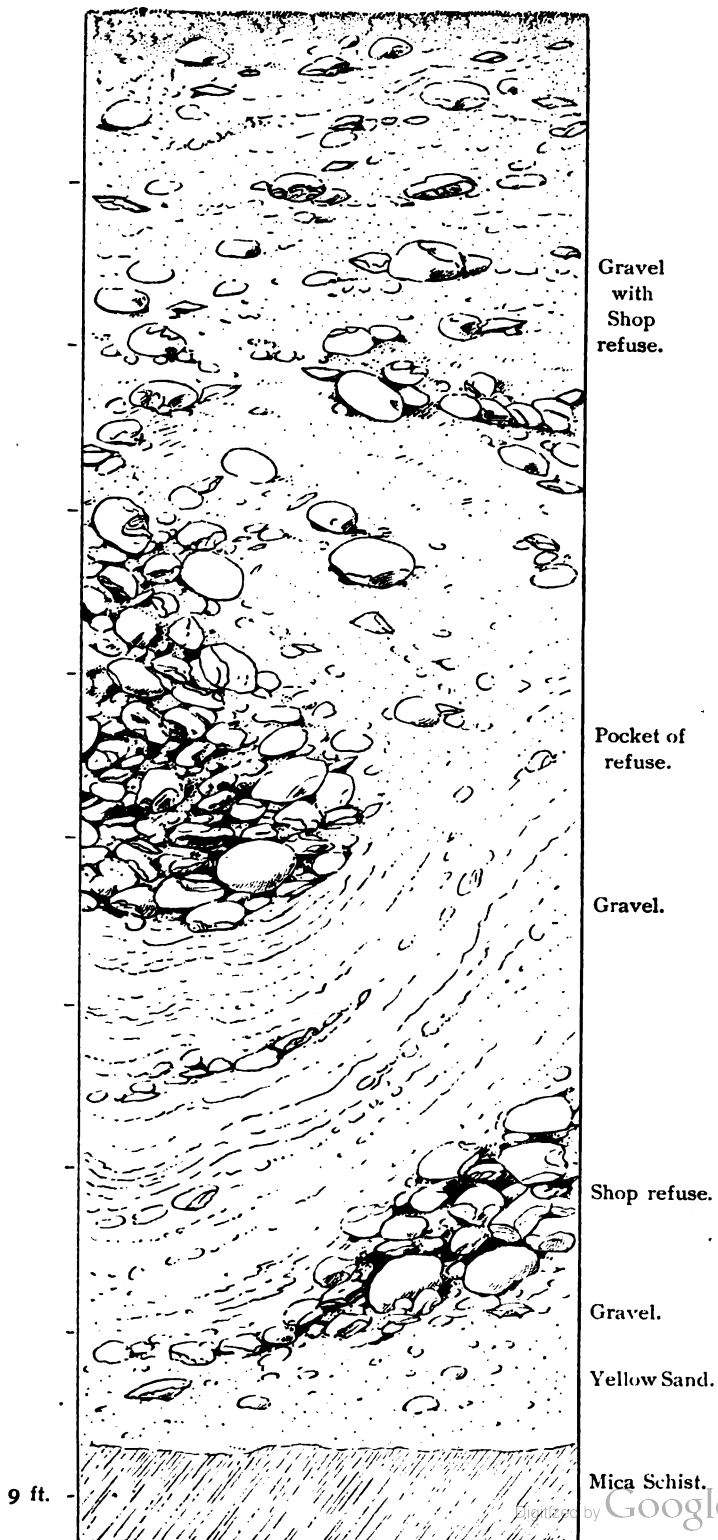
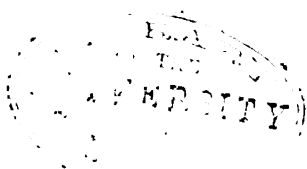


PLATE II.—Front wall of excavation at 77th foot,



Over this and extending to the surface are two or three feet of heterogenous deposits, consisting of coarse and fine gravels well stocked with all forms of artificial refuse. The upper part of these beds belongs to what I have called the post-artificial deposits as apparently they have been rearranged by natural means. The line separating the distinctly artificial from the rearranged or natural is too indefinite to be fully made out. It is generally not far from the bottom of the vegetable mold, which varies from two to fifteen inches in thickness, save where pits existed at the time of abandonment, where it is necessarily deeper.

The magnitude of the work accomplished by the ancient miners will be realized when it is stated that my trench crossed a belt of worked material fifty-five feet wide and, on an average, upwards of six feet deep, and that this belt extends horizontally along the bluff for an unknown distance. Judging by surface indications, it may extend half a mile or more.

The work of excavation does not seem to have begun at the lower edge of the worked belt next the stream and to have been carried up the slope and against the face of the boulder outcrop, but to have been carried along the slope from right to left, the gravel having been worked backward and downward as the pits advanced, filling up, to a great extent, the earlier excavations.

✓ As to the ancient methods of excavating the pits and moving the material we have learned but little. No remnants or trace of tools have been found. Wooden utensils, such as a primitive people might devise, would have served to loosen the boulders and remove the earth and refuse. Stone tools would hardly have been employed, as it would be folly to jeopardize finished stone implements in the rough work of quarrying and fracturing boulders.

The conditions seen at this point and recorded in the sections are representative of the whole site, so far as examined, and I need not here go into greater detail.

ART PRODUCTS.

We pass naturally from a study of the general features and phenomena of the factory site to an examination of the articles manufactured—to a consideration of the origin, development, and destiny of the stone implements produced. I wish here to call especial attention to the fact that perhaps never before has such an opportunity to study these latter points been presented to an American archæ-

ologist. Heretofore we have been called upon to lament both the meagerness of our material and the incomplete character of the evidence concerning it. In the present case there is an abundance of material and a completeness and clearness of evidence that leaves nothing to be desired.

From a trench three feet wide and fifty feet long cut through the artificial deposits of this slope I have obtained nearly two thousand worked stones, all exhibiting design, and have examined a thousand cubic feet of material, all or nearly all of which had been worked over by the ancient quarryman, and fully one-tenth of which consisted of artificial fragments.

If other parts of this promontory face are as well supplied with artificial products as this one—and the indications are that such is the case—we can safely estimate that the site contains over a million finished, unfinished, and broken implements.

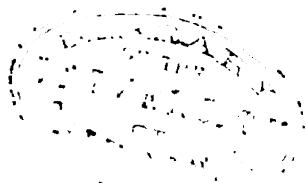
Of almost equal importance is the fact that this is an undisturbed quarry workshop which contains in one form or another multitudes of examples of each and every form made, as well as all the tools used in the making, and as it is not on a village site, and probably far from one, it is wholly free from domestic refuse and from all other exotic products.

The unexampled simplicity of the conditions is further emphasized by the fact that but one material—and that in one form—was used, and still more, that but one kind of machinery and one process were employed in all this great factory; and, furthermore, I may add, in advance of proofs which are forthcoming, there was but one period of work, and that by one race, whose clever artists had in mind, so far as this shop was concerned, but one ideal. The value and importance of this simplicity of condition will become more and more apparent as we advance in the investigation.

The material quarried and used was quartzite, a flinty sandstone. It was in the form of small ovoid boulders worn down by the action of water. These boulders were worked into desired shapes by the artist, and the tools he had to work with were also boulders identical in every way with those worked; and of prime importance in this discussion is the additional fact that the process employed was exclusively fracture by free-hand percussion, the act being a quick, firm stroke, regulated in force by the nature of the resistance to be overcome and by the result desired. I have found absolutely no trace of other kind of procedure.



PLATE III.—Portion of front wall of excavation at the 44th foot. Upper line of picture 2½ feet below surface of ground. Scale about 1 meter. The sharp reflex is seen to be uncommon.



The bold but unsymmetric outline of the tool, the haphazard arrangement of the strokes, and the width and irregularity of the flakes unite to preclude the idea that any process capable of adjusting the point of contact between the tool used and the article shaped could have been employed.

The first step in the classification and study of these implements, finished and unfinished, is to separate them carefully from the refuse. The line must be drawn, not between specimens showing evidences of work and those showing no evidence of work—for if this were done we would have to discuss a hundred tons of material—but between relics that bear evidence of design and those which do not. Many broken stones and flaked fragments and all chips show indisputable evidence of work, but their shape is not the result of design. A case in point is the stone from which flakes have been taken to be themselves shaped into tools. Such a stone, usually called a core, has a faceted appearance, suggesting design, but in itself it is not the result of design. Again, a flake or fragment broken from a tool already worked over will retain upon its outer surface a number of the facets of that tool, and thus to the careless observer it bears the appearance of having been itself subjected to the shaping process.

With these distinctions in mind, the archæologist has but little trouble in recognizing and separating all classes of products, and the uninitiated with a little careful study may readily learn to do the same.

Having handled the products of this shop constantly for a period of several weeks, I have familiarized myself with every variety of form and shade of contour, and do not feel the least hesitation in presenting the results of my selection and classification.

In Plate IV is presented a series of worked stones taken from this site, which represents every variety of product and epitomizes the entire range of form. Beginning with the boulder *a*, from which two chips have been taken, we pass through successive degrees of elaboration, reaching final forms in *k*, *l*, *m*, long leaf-shaped blades. Profiles of the type specimens are placed at the right. These illustrations are one-half actual size and are far from satisfactory, as it is extremely difficult to secure good photographs of objects whose prevailing colors are greenish and brownish grays.

If it be asked how I know that this series is complete, I answer that quartzite, the material used, although so firm and indestructible,

is at the same time brittle. It is impossible to shape from it flaked tools, howsoever simple, and succeed in every case. Some—I may safely say many—are necessarily broken, and the discarded remnants tell the story. A careful study of every shade of form shows that more are broken than remain in the workshop entire, and I may add that had every entire flaked tool been taken from the spot the record would remain, and with a certainty that is absolute.

Referring again to this series, we see that the process of manufacture and the steps of development are essentially as follows:

Grasping a boulder in either hand, the first step was to strike the edge of one against that of the other at the proper angle to detach a flake. The second step and the third were the same, and so on until the circuit was completed. If no false step was made and the stone had the right fracture, these few strokes, occupying but as many seconds, gave as a result a typical turtle-back—a boulder with one side faceted by artificial flaking—the other side, save through accident, remaining smooth. If the removal of a single row of flakes was not satisfactory, the work was continued until the availability of the stone for further elaboration was properly tested. This completed the first stage of the manipulation. A type profile is illustrated in *n*.

If the results thus far were satisfactory the stone was turned in the hand, and by a second series of blows the remaining smooth side was flaked away, and the result was a two-faced stone or double turtle-back. With, perhaps, a few additional strong strokes the rough stone began to assume the outlines of the final form, and the second stage was soon completed, a type profile being seen in *o*. If at this stage, and I may say if at any preceding stage, the stone developed defects or unmanageable features—such as too great thickness, crookedness, or humps that could not be removed—it was thrown away and thus became part of the refuse; and it would appear that all the entire specimens collected belonging to these two stages, since they were taken by us from the refuse, did develop some of these failings, and the same may be said of their 500,000 brothers and sisters.

If, however, the form developed properly, the work was continued into what I have called for convenience the third stage. It consisted in going over both sides a second and perhaps a third time, securing, by the use of small hammers and by deft and careful blows upon the edges, a rude but symmetrical blade. A profile is given

NOTES ON PLATE IV.

In this plate is presented a series of forms epitomizing the quarry workshop rejects and indicative of successive steps in the manufacture of implements. The scale is about one-half nature. Flakes and other fragments not exhibiting design are excluded.

a. Boulder with two flakes removed; probably rejected because of coarse grain and difficult fracture. This boulder, which is four and one-half inches long, three and one-half inches wide, and nearly two inches thick, is of typical shape and of nearly average size. The largest worked specimens are about one foot in length and the smallest not above an inch. Such extremes are rare.

b, c, d. Specimens worked on one side only and probably rejected on account of perverse fracture or excessive thickness. A profile is shown in *n*.

e. A few flakes removed from the back; fracture perverse.

f, g. Carefully worked on both sides, but still excessively thick, hence the rejection.

h. Broken by a stroke intended to remove a prominent hump. Profile shown in *o*.

i. Neat in shape but with a high ridge or hump on the back which many strokes have failed to remove. This piece could as well be classed with the second group as there is no very definite line between it and the third group.

j. Unsymmetric broken blade.

k, l, m. Thin, neat, broken blades. These must have been very near completion, so far as free hand percussion was concerned, as they are neatly flaked over the whole surface and are quite attenuated. That they were unfinished is indicated by the fact that they were broken while still under treatment. Their thickness is indicated in *p*.

To the first and second stages of manufacture belong many very rude, irregular, and broken forms that could not be represented in this series.

The last specimen of the series, *m*, is perhaps the most advanced form found, but that it was not finished is clear not only from the fact that it was broken by a strong blow while still under treatment but from the unfinished character of the point and portions of the edge.

It is highly improbable that we have in the whole series of products of the quarry, here epitomized, any finished tool, either whole or represented by fragments. This should not be regarded as an opinion merely; it is a conclusion based upon evidence that cannot be lightly treated by the scientific investigator.

in *p*. If, even at this stage of advancement, it was vitally defective, it was either broken in the attempt to correct the defect or was thrown into the heap as useless.

Four broken specimens that approach very closely the quarry-shop ideal are shown in *j*, *k*, *l*, and *m*. No good example of this class was found entire, and illustrations had to be selected from the broken specimens, both halves of which happened to be recovered, or from single halves. In nearly all cases such specimens have a broad end and a pointed one, and these features were generally foreshadowed in the first stages of manufacture, and were kept in view throughout the progress of the work. These blades vary from two to five inches in length, and are generally under two inches in width and less than one-half an inch in thickness. It was requisite that they should be straight and symmetrical, and that the edges should have a bevel as slight as consistent with needful strength. Only one piece was found that had been carried beyond this stage, a rude stem having been worked out at the broad end. This specimen was found near the surface. Two other pieces, found at considerable depths, exhibit slight indications of specialization of form, which, however, might have been accidental.

And now, having followed the process to the end, I wish to call especial attention to the fact, if my view be correct, that when this thin blade was realized the work of this shop and the only work of this shop, so far as shaping is concerned, was ended. The process and the machinery had accomplished all that was asked of them and all that they were capable of accomplishing. The neat, but withal rude, blades, and they only, were carried away, and that to destinies that we may yet reveal. Further work, additional shaping, if such there was, employed other processes and was carried on in other fields.

The course of procedure just described I have investigated in the most careful manner, and by experiment have followed every step of the process, and have achieved almost every result. I have found that in reaching one final form I have left many failures by the way, and that these failures duplicate, and in proper proportions, all the forms found upon the site.

I further find by these experiments, and the fact is a most important one, that every implement resembling the final form here described made from a boulder or similar bit of rock must pass through the same or much the same stages of development, whether shaped

to-day, yesterday, or a million years ago; whether in the hands of the civilized, the barbarian, or the savage man.

Now with these facts clearly in mind, it seems almost superfluous to expend additional words in showing that all forms found in the workshop other than the thin blades accidentally lost are mere waste; but in a matter having so important a bearing upon the very foundations of our study of primitive archæology no point should seem to be slighted.

It causes me almost a pang of regret at having been forced to the conclusion that the familiar turtle-back or one-faced stone, the double turtle-back or two-faced stone, together with all similar rude shapes, must, so far as this site is concerned, be dropped wholly and forever from the category of implements.

Our utmost effort cannot wring from them a fact or a suggestion of value upon any of the great questions of time, race, and culture, and it follows that what is true of the rude forms of this particular locality may be true also of all similar forms found throughout the Potomac valley.

But why should we regret such a conclusion? If the simple-minded savage, who laboriously quarried and shaped these forms, cast them at once and without hesitation into the refuse literally, there can be no sound reason why we, as searchers after truth, should hesitate to do the same thing scientifically.

I have obtained from this one small spot, less than twenty square yards in area, fully 1,000 turtle-backs of the two forms—a greater number than has been collected heretofore in the whole Potomac province. And why? There can be but one answer. This spot is a great workshop where tools were shaped or, rather, roughed out, and these things are the failures. The soundness of this view is further proved by the fact that these forms are not found carefully deposited in clusters or caches, but are distributed with considerable uniformity throughout the mass of refuse from top to bottom and from end to end.

But there is additional confirmatory evidence. I have prepared a statement by means of which some important facts will be made apparent. In this case the great importance of having at hand a large and exhaustive series of the art products of a veritable workshop becomes apparent.

As already seen (see Plate IV), I have divided the shaped forms into three classes, which are separable by well-marked steps or stages

of manufacture. In the series here presented four are of the first stage, four are of the second stage, and the remainder of the third stage. It is not convenient to divide the series differently or more frequently.

The relative numbers of these three classes found within the trench are given below. Halves in each case are recorded, as they serve to point out an important fact.

Of the first stage there are 380 whole specimens and 460 halves.

Of the second stage, 250 whole specimens and 320 halves.

Of the third stage, 12 whole specimens and 380 halves.

It will be noted that of the whole specimens of the third stage there are but twelve representatives, and I may add that these are comparatively rude, and with two or three exceptions can as well be classed with those of the preceding stage. Practically, therefore, there were no examples of the successful quarry products left upon the ground. All forms available for further shaping or for immediate use, as the case may be, were carried away as being the entire product of the shop, the only reward for the long-continued and arduous labor involved in their production.

Now these three stages do not necessarily represent the full scope of the art of the ancient tool-maker, and in this connection it is of the greatest importance that we should keep in mind the fact that this site is only a quarry workshop, which was naturally not a place for finishing tools, but one for roughing out the material and selecting that fitted to be carried away for final finishing. A laborer engaged in such work in a pit in the forest would not be likely to throw aside the rough hammer used in fracturing cobbles to take up and operate an entirely different kind of machinery, involving a distinct and delicate process. Being a reasoning and practical creature, he would carry away the roughed-out tools, the long, thin blades, to be finished at his leisure and by whatsoever method custom had placed at his disposal.

It may be well just here to define with some care the apparent limitations of the classes of procedure concerned in the manufacture of flaked tools.

Direct or free-hand percussion is the natural method of reducing large amorphous masses to something approximating the special shapes reached in the advanced stages of the art. It was probably the only method known in very early times; but this process, even in the most skillful hands, has its limitations in certain directions. For

example, blows cannot be given with sufficient regularity to secure great symmetry of outline and uniformity of flaking; and, again, when implements under treatment become attenuated the sharp blow is extremely liable to shatter them. The skill of the artificers being equal, these limitations vary with the degree of brittleness and homogeneity of the material used.

In the case of quartzite, free-hand percussion cannot accomplish more than the merest roughing out, as the material is extremely fractious; but it is equally true that by more refined methods as great or even greater difficulty in shaping this material would be encountered, and the skill of the workman must have been tried to the utmost to carry the manufacture by the first process to a stage where the other methods would be operative. It is probable that some method employing indirect percussion may have followed that of direct percussion. By indirect percussion I mean the use of two tools, one the hammer and the other the punch, the latter being set upon the exact spot to be fractured, thus eliminating the element of uncertainty characteristic of the free-hand blow, although at the same time losing a large part of the percussive power.

By the latter method, if not by the first, the rude quarry blades could be carried to a degree of symmetry and attenuation that would enable the artist to employ to advantage a bit of notched bone or a like device, and thus to carry the tool to the highest possible degree of specialization and finish.

At any rate, it is clear that the quarry forms bear no evidence whatever of that regularity and refinement of flaking and that neatness and symmetry of form that characterize results by these latter methods,

And now what of the probable destiny of the quartzite blades that, as we have seen, were graduated from the school of direct or free-hand percussion? Am I correct in the assumption previously made that they were carried elsewhere to be finished by more gentle methods of manipulation, or were they already finished and ready to go into the service of their rude owners?

There is a wide-spread impression that quartzite tools related to this quarry form are not found upon village sites in this vicinity, and that they are not generally distributed over the hills and valleys; but I find upon examination that this assumption is entirely without foundation, and that not only this form, but all others ranging from it down through the specialized and minute forms, occur in many places and in great numbers.

But I must add that to a limited extent the rude forms—the turtle-back and its near relatives—are also found widely scattered over the Potomac valley outside of the shops in the hills. This would seem to conflict with my former statement that all of these rude shapes are failures and were left upon the factory sites.

It is time, therefore, that I should define a stone-age workshop. It is any spot where an individual desiring to make an implement picks up one or more bowlders or bits of stone and proceeds to shape what he desires. It is a shop just the same if thousands of rocks and hundreds of men are concerned. It is a quarry workshop if the raw material is secured by means of excavation or is broken from masses of rock before the shaping begins.

Bowlders and bits of workable rock, singly or in numbers, are scattered over the face of the country—on the beach, on the river banks, in the woods, in the green fields, and on village sites. If rude, unfinished forms are not found on some village sites it is very probably because material suitable to be worked was not found upon the spot. I venture to surmise that upon extensive areas of alluvial land where the raw material is very scarce the rude forms of tools will be exceedingly rare, although all post-quarry and final products abound.

In this part of the valley shop sites are very numerous, and wherever they occur will be found relics representing the stages of manufacture—turtle-backs, double turtle-backs, and failures of every shape and kind, depending for their character upon the species and form of rock, the skill of the workmen, and the kind of tool designed; but in any case ordinary percussion was concerned in only the rougher work, and indirect percussion or pressure was employed in the final stages. The thick, clumsy forms are in every case mere refuse. There is so far no evidence that any inhabitant of the Potomac valley ever aimed to make by flaking alone any other than the attenuated forms, one-half an inch or less in thickness, such as we see in knives, scrapers, spear and arrow heads, perforators, and the like. Very rude forms may occasionally have been used in emergencies, or even may have been shaped for special uses of a local or temporary kind, such as quarrying soapstone or girdling trees; but the quarry forms here found were certainly not made to be used, and we have additional confirmation of this in the fact that it is exceptional to find examples of the class that show evidence of use, or even that were found in such situations as to indicate that they had either been used or valued.

A very large percentage of the chipped-stone forms found in our museums, and over which endless discussions have taken place, are only failures gathered from shop sites; while many others from shop sites and elsewhere are unfinished implements lost or thrown away before the final shape was reached. It was impossible to make these distinctions with accuracy until a veritable fossil shop-site, dissociated from other finds, was discovered and systematically explored. It may be said with much truth that the archæologist who studies flaked stones of any country without having made himself familiar with the functions and character of such a workshop is liable to make most serious blunders.

As a corollary of the determination of the true quarry product we arrive at the definition of a cache. The ordinary cache of stone implements is a cluster or hoard, numbering, perhaps, a score or more, which has been secreted or deposited in the earth by the owner, and who for some reason never exhumed it. Such hoards are frequently discovered by workmen in the fields.

Having reached a definite conclusion that the blades were the exclusive worked product of the quarry, I was led to investigate their subsequent history. The working of a quarry such as I have described led inevitably to the production of blades in numbers, and it follows that they were removed in numbers; since the supply for the entire year was to be obtained probably within a small fraction of a year, the working period being determined by the season, by tribal movements, or by other limitations of time.

In speculating upon the probable nature of the transportation, storage, and distribution of such quarry forms I happened to observe that they were identical in character with the objects usually contained in caches, and the conclusion was at once suggested that all such cache forms are quarry products—unfinished tools—varying in character with the material, the process, and the habits or needs of the people concerned; that they had been roughed out in numbers and to a stage of advancement that made them portable and at the same time placed them fully within the reach of the processes to be employed in finishing, and that they had been carried away to the villages and buried in damp earth, that they might not become hard and brittle before the time came for flaking them into the final forms required in the arts. The story begun in the quarry is thus expanded and the status of the cache tentatively determined.

The history of the quarry forms is not completed, however, until

we have noted their final distribution among the individuals of the various tribes, until we have witnessed the final step in the shaping process—the flaking out of specific forms with a tool of bone—and their final adaptation to use and dispersal over the country.

And now, hastening over this interesting field, the problem of age and race, so far as the results of this exploration relate to them, must be hurriedly examined.

AGE AND RACE.

The question of the antiquity of the period of occupation is one of paramount interest and importance. When it is fully and finally answered we shall no longer be uncertain as to whether our researches refer to a well-known people or to a race shrouded in a thick veil of mystery.

If the attainable evidence is against great age, or even if it is not decidedly in favor of great age, the natural conclusion is, or ought to be, that the race concerned is the Indian; for he is well known to us as an actual occupant of the region, and the period of his occupancy, while coming down to our time, and therefore recent, is not at all well defined in respect to the other limit. If, on the contrary, the evidence favors great age—if the latest limit of the period of occupation is remote and apparently far antedates the period of which we have historic knowledge—we shall not perhaps be warranted in identifying the ancient quarry-worker with the Indian, and ultimately may even find it necessary to refer him to another and earlier stage of culture.

Unfortunately we have in the Potomac valley but meager and imperfect indices of age. Geology, the great time gauge, is not known to have made a definite record since the first glacial epoch, a period antedating traces of man, and therefore important proofs of a geologic nature bearing upon this question do not exist, and answers to questions concerning remote chronology must be sought elsewhere. There are some minor records, however, pertaining to geology which are worthy of careful study.

The art relics from the site examined are, as we have seen, more or less intimately associated with three formations. Two are old, antedating the advent of man, and the other is now in process of accumulation and alteration under conditions that have been practically the same ever since glacial times. These associations, therefore, of themselves afford no assistance whatever.

An examination of the quarry-shop refuse makes it apparent that the period of occupation was very long. The accumulations of worked material are of enormous extent and remarkable thickness. Their general compactness is also a notable feature. At the same time it can hardly be claimed that these facts aid materially in settling the question at issue. The same may be said of the growth of forest trees upon the site. A fine chestnut tree fully a century old stands upon the surface of a bed of refuse which is filled with artificial remains, and that to a depth not even penetrated by the strongest roots; but the age of a tree or of many generations of trees will not carry us back beyond the period of the Indian.

The deposits are deep, but their accumulation may have been rapid, and the indications are strong that it was rapid. They are compact in parts, indicating, perhaps, a considerable lapse of time; but in other parts they are not at all compacted, and the pockets of coarse refuse are, as I have already shown, quite open and full of cavities—a condition not regarded by geologists as consistent with great age. So far as my excavations extend, there is no indication of a break in the period of occupation, and the implements are alike from bottom to top. Again, the evidences of accumulation and excavation are still apparent upon the surface, and this indicates a date the remoteness of which is to be reckoned by centuries rather than by tens of centuries.

That but a single stage of culture is involved and that a single race was concerned are clearly shown by the uniform character of the relics and the manner in which they occur. In one case a small pocket of refuse was encountered at a depth of forty inches, from which all the tools, flakes, and fragments were preserved. Subsequently, when these were washed and examined, they were found to include one entire typical turtle-back, which had apparently been thrown aside because of its great thickness; all the fragments of an implement quite well advanced in the second stage, but which had been broken in attempting to remove a hump, and a blade in the final stage which had been broken at the very verge of completion. The chips struck from these objects were in the cluster with them, and there can be no doubt that all these forms, covering the whole range of so-called tools from the rudest turtle-back to the final blade, were made by the same man and on the same day and probably within a single hour. Unity of time as well as of race are thus demonstrated.

The question as to the remoteness of the time has already been reviewed, and the question of the race concerned may now receive a moment's attention.

It would seem from what has been said that geologically there is nothing to carry the history of man in this place back beyond the age of the Indian, and that a number of things conspire to confine it to that period.

I find no evidence of a cultural kind that points significantly towards another race. Mining and quarrying are well-known accomplishments of the Indian, and on Rock creek and near at hand are soapstone quarries that no one would think of attributing to any other people. The mounds and shell heaps which are known to be of Indian origin bear equal or greater evidence of antiquity than do the remains upon this site.

The absence from this site, so far as known, of finished tools of flaked or polished stone and of pottery has given rise to the assumption that the race concerned did not make or use these things, and it is argued from this that they could not have been our Indians; but it would seem that there is really little apparent reason why any people quarrying boulders and roughing out rude implements in the hills should carry finished tools into the pits, and there certainly would be no excuse whatever for having pottery there. Besides, it should be remembered that my excavations have been carried over a very small portion—one-thousandth part, perhaps—of the workshops, and that other classes of art remains may yet be found.

The unity of the art of the quarries so far as known is, as we have seen, easily and conclusively shown. Is it not also possible to demonstrate the unity of the flaked-stone art of the whole Potomac province? A review of the field makes it clear that if the theory of the occupancy of this valley by an early man had not been suggested from without there would have been no occasion for asking such a question, for every appearance indicates homogeneity not only in art, but in race as well.

The flaked-stone implements of the region are readily grouped under a few heads, including knife-blades, scrapers, spear-points, arrow-points, and perforators. Other forms are known, but they are not of importance in the present study and at best were not standard products of the flaking art, but rather emergency tools made to answer some temporary or purely local purpose.

Two of the groups, the arrow and spear heads, are perhaps the

most numerous and important, as they naturally would be with a fishing and hunting race. They include wide but closely similar ranges of form, the two classes varying little save in size, and this difference may be easily accounted for by differences in the material. Quartz is fitted for the manufacture of small forms only on account of its brittleness, lack of homogeneity, and flawed condition, whereas quartzite is tough, coarse-grained, and fairly homogeneous, and while well adapted to use for large tools is difficult to shape into small or delicate ones. Jasper, slate, flint, and other rocks are comparatively rare and from necessity occupy a secondary place in our primitive art. To all appearance the differences in size are reasonably accounted for without appealing to distinctions in culture or race to explain them.

Now, for the purpose of securing another point of view from which to study the quarries and the quarry products, let us suppose that no example of the workshops had been discovered, and that the source of supply of the raw material was wholly unknown. Viewing the vast number of spear and arrow heads of quartzite found scattered over the hills and valleys and taking into account the multitude that still lie buried in humus and alluvium, the question would naturally arise, where are the sources of the material, and where are the great quantities of refuse that must have resulted from such extensive manufacture?

Nearly all of the quartzite found in this region is in the shape of boulders, and we are safe in concluding that in the manufacture of ten thousand tools—a moderate estimate of the number lost within this valley—hundreds of thousands of failures were made and millions of flakes and fragments were left upon the ground. It has been observed that these boulders are scattered over the surface of the country, and in many places they have been worked, but they occur in very limited numbers, and having been seasoned by long exposure they are extremely difficult to reduce to desired shapes. Through the investigation of Mr. McGee we have learned that the area affording a plentiful supply of quartzite boulders of a size suitable for use in shaping tools is very limited, and that it is confined to the bluffs of the Potomac river within and immediately below the District of Columbia, and it follows from this that the factories where implements were made and the refuse resulting from the manufacture must be found within the range of vision from our house-tops.

But, as we have seen, the quarries and factories have actually been found, and it is ascertained that they answer in every way the requirements of the case.

Every quartzite point made from a bowlder had to go through all the stages of manufacture already carefully described, and with these quarry workshops in sight it would be absurd to still ask where and how these implements were made. It is impossible to escape the conclusion that these quarries were the source of the material, and that here the implements were roughed out, and the presumption is very strong that the quartzite art of the valley is a unit, and that but one people was concerned in the manufacture and use of the implements.

It follows still further, since the quartzite shapes are identical with those in quartz and other materials, that the chipped-stone art of this valley is practically a unit, and that nothing short of the discovery of wholly new evidence will make the theory of occupancy by another race than the Indian tenable.

Notwithstanding the apparent conclusiveness of the evidence of ethnic and cultural unity, the lessons derived from other regions should not be disregarded. The interpretations placed upon implements found elsewhere and corresponding closely to ours are eloquent of the history of early races and of the evolution of culture.

Many of the rude implements of the Seine—assigned to a great antiquity and to an unknown race—are nearly identical with our quarry forms. On the Thames the analogues of nearly all classes of rude implements are found in the high, level gravels, thus carrying history back with certainty to remote ages. In the Delaware valley the rudest forms, corresponding to our flake shapes, are obtained from glacial gravels, and the less rude varieties occur in more recent formations or under conditions that seem to make them safe indices of the steps of progress. In the Potomac valley, on the other hand, all the rude forms appear to be but failures or unfinished pieces representing stages in the manufacture of arrow and spear points of the Indian.

In view of this apparently anomalous state of affairs it may be held that as in biology the growth of the individual epitomizes the successive stages through which the species passed, so in art the flaked-stone tool of the highest type advances through stages of manufacture each step of which illustrates a period of human progress in culture.

It should be remembered, however, that the investigations of this locality are not yet completed, and that in view of this fact it would be unwise to assume that in all cases final results have been reached. It is quite possible that our chipped implements are in a measure separable into chronologic or cultural groups, for the American Indian did not always occupy one plane. In common with other divisions of the human family he must have risen by degrees from lower to higher levels of culture. The chipped-stone art, however, in itself a simple one, may have reached comparative excellence rapidly and in very early times, and far in advance of more complex and less practical arts. In any event it is probably not very sensitive to cultural changes, and may have remained for a long time practically stationary while the procession of other arts moved steadily on.

It is believed by Mr. McGee that the river gravels formed in the Potomac valley since the first ice epoch and possibly containing evidences of early man have been depressed beneath tide water. If such is the case, we are as helpless here as our confreres at Trenton would be if the estuary gravels of the Delaware, now yielding such important finds, had sunk wholly from sight in pre-Columbian times.

It is within the range of possibility that other classes of evidence may yet be forthcoming. The discovery of shelters, caves, or village sites occupied by distinct peoples or by the same people at widely separated periods, or of human remains in connection with the remains of extinct animals, would throw new and strong light upon the early history of man in this valley.

As to the present state of the evidence, I hold that there can be but one opinion. It is impossible to show that there exists the slightest trace of any other race than the American Indian as he is known to us, and I am convinced that if the great Powhatan should at this late day rise from the dead and claim for his people all the stone implements of the Potomac valley no reasonable objection could be made to the claim.

SUMMARY.

And now a few of the salient points brought out in the preceding pages may be recalled :

A quarry workshop of the flaked-stone implement makers has been identified, examined, and described.

The quarrying is found to have been extensive and the remains are of surprising magnitude.

The manner of quarrying, the material quarried, and the purpose of quarrying have been studied.

The processes of manufacture have been determined and the articles manufactured have been described.

It has been shown that percussion was used exclusively, and that any people chipping ordinary implements from bowlders must necessarily follow the same steps and reach similar results.

It has been shown that a well-marked distinction exists between quarry work, which is a roughing out by percussion, and the after shaping and finishing of special forms, which is accomplished chiefly by gentle means, such as pressure, and that it is highly improbable that the latter work would be conducted upon the same site as the former.

The true nature of a workshop has been defined, and the occurrence of rude forms or failures in or their absence from certain localities is thus reasonably accounted for.

It has been shown that the blade alone was carried away from the quarry, that it is the cache form, and that it, with the whole range of forms naturally derived from it, are found upon village sites and elsewhere.

That all or nearly all our quartzite tools have been derived from bowlders obtained in the Potomac valley near Washington, and that there is every reason to believe that these quarries on Rock creek are the main source.

That all chipped implements known to have been generally used in this valley are thin forms, such as the knife-blade, the spear-point, the arrow-head, the perforator, and the scraper, and that all these are typical Indian forms, and that the art remains are practically a unit.

That the existence here of another and a more ancient race than the Indian has been predicated upon a class of objects which, being mere refuse, have of themselves no ethnic or chronologic significance whatever.

That our geologic evidence is extremely slight, but that what there is seems to be rather against than for great age for the period of occupation.

And, finally, that all visible evidence so far collected, chronologic, cultural, and ethnical, point to the Indian as the laborer in these quarries and as our only predecessor in the Potomac valley.

In conclusion, let me say that I am ready to modify any of the above statements, inferences, and conclusions when the facts are found to warrant the change, and that I shall seek earnestly for evidence of antiquity, and shall heartily welcome the appearance of an early man upon a field of investigation whose interest will be quadrupled thereby.

IN NEARLY every community may be found one or more enthusiastic devotees of archæologic research, many of whom are actively engaged in collecting relics of ancient art. It is rather exceptional, however, to find the work systematically carried on ; to find adequate records kept and proper care taken of the collections, and these are prime considerations to those who would make their treasures available for scientific purposes. It is the collector who attends to these matters, and especially he who at the same time devotes himself to particular localities, who becomes in time the benefactor of archæologic science.

The Potomac Valley is a fine field for the collector and student, and this fact becomes more apparent every year. From the Apalachian region, meandered by the Upper Potomac, Mr. F. M. Orfut, of Cumberland, has amassed a most valuable collection. Mr. Hallett Phillips, S. V. Proudfit, and E. R. Reynolds, of Washington, have each a large series of valuable relics. That of Mr. Phillips illustrates a narrow belt bordering the banks of tide-water Potomac, while the others are somewhat more general. The collection of Mr. J. D. McGuire, of Ellicott City, Maryland, is more than usually important. It represents the region lying between Chesapeake Bay and the Lower Potomac, and is noticeable for a number of unique features. Among these is a series of the products of the ancient soapstone quarries of the region, including many roughed-out pots and a remarkable series of rude pick-like tools of stone, used in quarrying and shaping the vessels ; also a number of superb sets of cache finds.

Mr. N. S. Way and Mr. Wm. Hunter, of Mount Vernon, and Mr. O. N. Bryan, of Marshall Hall, with several others, have done excellent work, and many of these gentlemen have contributed all or a large part of their valuable finds to the National Museum.

W. H. HOLMES.

**ANTHROPOLOGY IN PARIS DURING THE EXPOSITION
OF 1889.**

BY OTIS T. MASON.

The opportunities to study the natural history of man in Paris during the Exposition, and especially in August, when the great Congresses and the French Association held their sessions, were unparalleled in the history of anthropology. At any time the French capital affords rare advantages to the anthropologist. The Musée and Laboratoire Broca, the anthropometric operations of Bertillon in the Palais de Justice, the courses of lectures in the École d'Anthropologie, the collections in the Jardin des Plantes, the facilities for original work in the Écoles de Médecine, and the hospitals give to the comparative anatomist and biologist abundant employment.

The museums of human arts, however, are the crowning glory of Paris. In them may be traced the whole history of France from the first human action to the latest exposition; and they are so divided in function that the work of one does not interfere with the work of the others.

To examine them in order one should commence with the palace of St. Germain-en-Laye, 13 miles from Paris by rail, omnibus, or boat. This beautiful structure was erected by Francis I for a royal residence. Here were born Henry II, Charles IX, and Louis XIV, and here died Louis XIII. Surrounded by a park of ten thousand acres stands the building in which may be read the material record of France down to the beginning of the Middle Ages. In one of the upper halls, arranged in the most perfect order, is the story of the Stone period. Here in the upper left-hand corner, as on a printed page, you begin with the burned and wrought flints of the Abbe Bourgeois, to which archæologists go for proof of the existence of man in early Tertiary. You will have no difficulty in finding your way around the hall, but the Congrès d'Anthropologie were so fortunate as to have the venerable G. de Mortillet as guide, who organized and arranged the exhibits with his own hands.

Few of the men who heard his address in August last will soon forget his earnest manner and confident air as he explained and defended the classification, now generally adopted for European

archæology. Some of the eminent and world-renowned exhibits in this hall are the finds of Boucher de Perthes, at Abbeville, and the relics of Solutré, and of the caves of Western France.

The Director of the Museum, M. Alexander Bertrand, honored the Congrès with his presence, but the task of conducting the members through the halls devoted to the Bronze Age, the Roman period, and the early Christian occupation of France, devolved upon Dr. Reinach, one of the rising young archæologists of Paris, whose familiarity with the subject is only equalled by his enthusiasm and his eloquence.

Some of the members of the Congrès had taken an early train to St. Germain so as to spend the whole day on the ground. They were amply repaid for their pains, and the American delegation, especially, were astonished to see twelve large halls devoted to a department of anthropology which in Washington is confined to one.

Before leaving the subject of the Stone Age, we must not forget that special problems in archæology arise upon the very site of Paris. The Seine gravels and their revelations are illustrated in the St. Germain Museum, but the Congrès devoted one day especially to the explorations in this region, and adjourned at the invitation of Count D'Acy to examine his private and unique collection from the Seine valley around Paris.

The advantage of studying this vast material in company with the most learned men in the world and under the guidance of the distinguished explorer himself was fully appreciated by all participating.

To continue the study of French history it is necessary to pass from St. Germain to the Palais Thermes and Hotel de Cluny. The most ancient Roman monument in Paris, known as Palais des Thermes, was erected in the first year of the fourth century. Its construction is attributed to Constantius Chlorus, father of Constantine, who died in 306, and it is the last vestige of the vast structures erected by the Roman emperors on the site of ancient Lutetia.

It embraces great buildings, baths, and gardens of immense extent, and during several centuries was the residence of the first and the second lines of French kings.

The Hotel de Cluny, erected for the most part on the ruins of the Roman palace, dates from the second half of the fifteenth century and is the sole specimen of the second Gothic period now intact in Paris.

In 1833 M. du Sommerard chose the old establishment as an asylum for his collection of objects illustrating the art of the Middle

Ages and of the Renaissance. This collection was acquired by the State in 1843 and the new museum was founded under the name of "Musée des Thermes et de l'Hotel de Cluny." The galleries of the hotel have been restored and the collections arranged to suit the buildings. In the vaults of the old Roman palace are disposed all the monuments in stone belonging to the Gallo-Roman and the following centuries, the Roman altars erected to Jupiter by Parisian sailors in the reign of Tiberias, the marble columns of the temple on whose ruins was built the church of Notre Dame de Paris, sculptures from St. Germain des Pres, St. Jean de Lateran, St. Benoit, and other ancient buildings of Paris, and Gaulish monuments from other parts of France collected by M. E. de Sommerard.

In the galleries of the Hotel de Cluny are the relics of the Middle Age and of the Renaissance in stone, wood, ivory, enamel, glass, faience, jewelry, armor, and weapons.

The age of the Palais de Thermes helps one to remember that the dividing line between St. Germain and Cluny is about the sixth century. To one who loves to trace the growth of ideas and inventions this is indeed a marvelous place. The arrangement is by arts and by ages, so that the ceramist, the metallurgist, the wood-carver, and the embroiderer enjoy the best opportunity to study the results achieved in each art during a millennium.

The best displays of Gallic art triumphs in the modern period must be studied in the Louvre Museum of Painting, Museum of Drawing, Museum of Engraving, Museum of Antique Sculpture, Museum of Middle Age and Renaissance Sculpture, Museum of Modern French Sculpture, Museum of Assyrian Antiquities, Museum of Egyptian Antiquities, Museum of Greek and Roman Antiquities, Algerian Museum, Naval Museum, and Museum of the Sovereigns.

Still more actively associated with the history of French thought and ingenuity are the Palais de Luxembourg, where are to be seen the works of living artists, which have been purchased by the government after the annual exhibitions, in the Gobelin tapestry works, the Sèvres potteries, and a thousand other busy hives which I cannot stop to mention.

The later studies of criminology, poverty, delinquency, fecundity, longevity, vigor, stature, &c., all included in the two terms anthropometry and demography, find their best illustrations in such operations as those of Alphonse Bertillon in the Palais de Justice and the studies of the Société d'Anthropologie.

In addition to the history of France, the study of anthropology for the whole world has been specially favored in Paris. For a purely biological side of the science, or that which relates to man's body simply, you must go to the Jardin des Plantes, where, under the regime of the venerable de Quatrefages and Professor Gaudry, you will be permitted to see an osteological collection set up with special reference to the archæology and natural history of man. After that you cannot omit the Musée Broca, in order to witness the active studies of Manouvrier and Chudzinski in osteometry, where the results of the great Broca's studies are preserved as a monument to his memory, and where the Société d'Anthropologie de Paris and the École d'Anthropologie are both conducted.

To complete the anthropologic circle, the Musée Trocadero is devoted to the arts of modern peoples, arranged geographically. It is to Paris what the Museum für Völkerkunde is to Berlin or the Royal Museum of Ethnology is to Copenhagen. Here we are under the guidance of Dr. E. T. Hamy, who is also the secretary general of the Congrès.

Not very far from the Trocadero is one of the most interesting collections in the world, called the Musée Guimet, after the illustrious citizen of the city of Lyons to whom it owes its existence.

This museum is devoted entirely to the history of religion, and so far pays most attention to the great religions of antiquity and to the modern Asiatic faiths. A separate home is set apart in the building for each religion. For instance, the religion of Egypt occupies a separate suite, the walls being covered with hieroglyphics. The columns and ceilings are copied from ancient temples of the Nile. Even the vitrines are faithful imitations in their legs and moldings of old furniture belonging to the Pharaohs. It is the same in the Buddhist and other rooms. The *genius loci* is the spirit of the religion illustrated. The city of Paris has furnished the ground and the French government has erected the building, the most perfect of its kind in the world, to honor the industry and learning of M. Guimet. To add perfection to this unique museum, two publications have been successfully conducted—*Annales du Musée Guimet* and *Revue de l'Histoire des Religions*.

To add completeness to this sketch of anthropology in the French metropolis a word should be said about the associations and publications devoted to our science. At present the Société d'Ethnographie and the Société d'Anthropologie are the active agents in the

study of the natural history of man, the latter being far in the lead. A very complete course of lectures has been organized and is annually conducted by the members of this society, and called the *École d'Anthropologie*.

The publications of greatest merit have been up to this time—

Bulletin de la Société d'Anthropologie de Paris.

Révue d'Anthropologie.

Révue d'Ethnographie.

Révue de l'Histoire des Religions.

Materiaux pour l'Histoire primitive et naturelle de l'Homme.

At the present moment some of these are in a state of fusion, and new ones devoted to demography and other social questions are to be founded. Indeed, further mention should be made of *Archives de l'Anthropologie Criminelle et des Sciences Pénales*, the publications of *l'Institution Ethnographique*, *Bibliothèque des Sciences Contemporaines*, *Bibliothèque Anthropologique*, *Bulletin de la Société de Géographie*, *Dictionnaire des Sciences Anthropologiques*, *Gazette Archéologique*, *Journal Asiatique*, *Les littératures populaires de toutes les Nations*, *Mélusine*, *Révue de Mythologie*, etc., *Révue Archéologique*, *Révue de Linguistique*.

It would not be proper to omit from this notice of special pleasures and advantages accorded to the anthropologists who visited Paris in August the delight which every one experienced in being able to look into the faces of distinguished men previously known only by correspondence and through their published works. Besides the French savants already named and many more, there were present from England, the Continent of Europe, and from the two Americas the best-known anthropologists. This pleasure was somewhat marred by the conspicuous absence of our German confreres, who had an excellent opportunity to show their magnanimity, and lost it. It is, therefore, with the greater satisfaction that the presence of Dr. Schliemann is mentioned and his part in the discussions noted.

But the crowning glory of anthropology was the French Exposition. Any one who visited that great spectacle became speedily convinced that the interests and studies of the anthropologists of Paris had not been confined to France. It was possible to see there twelve types of Africans, besides Javanese, Tonkinese, Chinese, Japanese, and other oriental peoples, living in native houses, wearing native costumes, eating native food, practicing native arts and rites on the Esplanade des Invalides side by side with the latest inventions and with the whole civilized world as spectators.

It was possible to commence near the base of the "Tour de trois cent metres" with models in actual size of rock shelters, igloos, wigwams, bark lodges, straw hovels, and, without leaving the grounds, to study every style of habitation in which human beings have ever lived or ruled or worshipped.

It was possible to trace the stream of inventions devoted to travel or transportation from snow-shoes, stilts, and other simple aids to locomotion through the domestication of animals, wheel carriages, navigation, steam-travel, electro-motion, and aeronautics.

Here in one building were groups of men and women, life size, illustrating the first French cave-dwellings, dressed in skin and working with paleolithic implements; the Cro-Magnon man and his wife carving an antler; ancient Mexicans manipulating agave fibre; the dolmen-builders at work on a model which is actually a cast of one of the most celebrated in Europe; a group of men working in flint quarries; the first smiths, in the persons of a group of Congo negroes, operating with stone tools and monkey-skin bellows; a group illustrating the Bronze Age, tent makers and dwellers, Chinese potters and cloisonné-workers, Assyrian sculptors surrounded by typical furniture and cuneiform inscriptions, Grecian potters producing the beautiful black and red ware often called Etruscan, Roman matrons spinning and weaving, and perhaps others.

This artistic grouping was intensified and vivified by the presence of men, women, and children in the several spaces devoted to foreign exhibits actually engaged in more species of hand-work than there is space here to enumerate. Add now to the rich collections of specimens, illustrations, and literature always accessible in Paris and to the exposition, in which greater attention was paid to anthropology than in any previous one, the presence of the congresses, and some appreciation of the activity and interest of the occasion may be attained.

In addition to the sessions of the French Association for the Advancement of Science, whose meetings and papers were supplemented by frequent visits to the Exposition, there were 120 Congresses in Paris during the months from May to October, inclusive. All of these had some reference to man and his works, and a few of them were purely anthropological, to wit:

June 24-29. Protection of Works of Art and of Monuments.

Aug. 4-11. Hygiene and Demography.

Aug. 5-11. Physiological Psychology.

Aug. 8-15. Association Française pour l'Avancement des Sciences.

Aug. 10-17. Anthropologie Criminelle.

Aug. 19-26. Anthropology and Prehistoric Archæology.

N. D. Sciences Ethnographiques.

N. D. Traditions Populaires.

All these were important occasions, for which the amplest provision had been made by enthusiastic specialists. In each of them the latest methods of research were earnestly discussed and not always with perfect unanimity. The future of each branch of inquiry was also a matter of constant study. The papers read were worthy of publication, only if all that was said and done in all the Congresses were published the world would scarcely contain the books.

The meeting for which the greatest preparations were made was the tenth reunion of the Congrès Internationale d'Anthropologie et d'Archéologie Préhistoriques, the ninth session having been held in Lisbon, September, 1880. The sessions for the reading and discussion of papers were held in the assembly hall of the University.

The questions discussed in the Congress were the following:

1. Erosion and filling of valleys and filling of caverns, both in their relation to the antiquity of man.
2. Periodicity of glacial phenomena.
3. Arts and industries in the caverns and in the alluvium. Value of palæontological and archæological classifications applied to the quaternary epoch.
4. Chronological relations between the ages of stone, bronze, and iron.
5. Relations between the civilizations of Hallstadt and other stations in Daubes and those of Mycenæ, Tirhyns, Issarlik, and the Caucasus.
6. Critical examination of crania and other human bones alleged to have been found in the quaternary during the last fifteen years. Ethnic elements peculiar to the different ages of stone, bronze, and iron in Central and Western Europe.
7. Ethnographic survivals which throw light upon the social condition of primitive populations in Central and Western Europe.
8. How far do archæologic or ethnographic analogies authorize the hypothesis of prehistoric consanguinity or of migrations?

Under any circumstances the consideration of such important questions by so learned a body of specialists would have been worthy

of attention. But consider the auspices under which these meetings were held! The local committee of arrangements—including the, to us, well-known names of de Quatrefages, Bertrand, Hamy, Cartailhac, Chantre, Duval, Edwards, Faedherbe, Girard de Rialle, Hébert, Lagneau, Letourneau, Mortillet, Nadaillac, Pozzi, Reinach, and Topinard—left nothing to be desired.

If the anthropologists did not organize the great Exposition they at least furnished the presiding genius. Without doubt, of all expositions that have been held that of 1889 was most thoroughly anthropological. The members of the Congrès, both individually and collectively under excellent guidance, found the collections in the Palais des Arts Liberaux specially interesting.

The History of Industries, of which mention has been already made, was organized by Mm. Hamy, Cartailhac, Nadaillac, and Topinard, as well as the reconstructions of prehistoric and ancient life. Besides these, we were called upon to note M. Piette's collection from the grotto of Mas-d'Azil and the grotto d'Arudy; those of Mm. Massenat, de Lastic, Hardy, Paysant, Feaux, Maillard, Taté, Capitan, and others; others from the rude and the polished stone period made by Lecoq, Collin, and the Scientific Society of Archachon; dolmens explored by the Société Polymathique de Morbihan; illustrations of the age of bronze and of iron in France, Persia, Caucasus, and of the prehistoric archæology of Spain; collections from the stone age in French Africa, Cochinchina, Japan, Oceanica; Scytho-Byzantine objects from the Caucasus; Mexican archæology; Gallo-Roman archæology, and, most attractive of all, the stone age of Denmark—an exhibit of which Dr. Müller and Dr. Schmidt were justly proud.

In this same Palais des Arts Liberaux there were ethnographic collections, such as those from Oceanica made by Bourdil, Foureau, Cunisset-Carnot, Collignon, Dort, Mougeot, Holbe, and Bourdil; others from Mozambique and Australia, and those of Prince Roland Bonaparte.

There was also a creditable display in anatomy, though it was very much crowded, to illustrate the comparative anatomy of man and the higher animals, the fossil men of France, and crania from various regions. The models and casts to show the latest studies in criminal anthropology were also much examined.

In the space allotted to the Missions Scientifiques in the same building were anthropological specimens from Greenland, Orinoco, and

other parts of South America, West Africa and the Canaries, Indo-China and Cambodia, Malaysia and Ceylon, and New Guinea.

Besides the anthropological exhibits in the Palais de l'Industrie, much material relating to our special subject was to be seen in the colonial and foreign pavilions. For example, Finland, Mexico, Ecuador, Nicaragua, Venezuela, Colombia, Hawaii, Portugal, New Guinea, Transvaal, Algeria, Tunis, Anam and Tonkin, French India, Tahiti and French Oceania, New Caledonia, Mayotte, Guiana, Senegal, Gabon, Congo, Guadeloupe (Guesde), Cambodia, Cochin China, and Java.

A portion of the space near the Invalides was set apart for the exhibition of African and Franco-Indian natives at their characteristic occupations, chief among the popular attractions of which were the Javanese theatre and the Annamite Buddhist temple. The members of the Congrès, guided by the local committee, spent many hours in these savage enclosures and houses studying the people and their arts and listening to their rude music.

Under such favorable auspices met the Ninth Congress of Anthropology and Prehistoric Archaeology. It will be long before such wonderful advantages are again brought together for studying the natural history of man.

The previous congresses have been as follows :

Congrès internationale d'Anthropologie et d'Archeologic prehistorique, founded in Spezzia in 1865.

Congrès :

1. Neufchatel, 1866. *Compte rendu*, 8vo ; Paris, 1866.
2. Paris, 1867. *Compte rendu*, 8vo ; Paris, 1868.
3. Norwich, 1868. *Compte rendu*, 8vo ; London, 1869.
4. Copenhagen, 1869. *Compte rendu*, 8vo ; Copenhagen, 1870.
5. Bologna, 1871. *Compte rendu*, 8vo ; Bologna, 1873.
6. Bruxelles, 1872. *Compte rendu*, 8vo ; Bruxelles, 1873.
7. Stockholm, 1874. *Compte rendu*, 8vo ; Chalons, 1875.
8. Buda-Pesth, 1876. *Compte rendu*, 2 vols., 8vo ; Buda-Pesth, 1887.
9. Lisbon, 1880.
10. Paris, 1889.

So marked was the success of the Paris Exposition in regard to its anthropologic results that it would seem to be most fitting to

invite our foreign associates to meet us in 1892 at our own exposition on American soil, where occur so many problems of interest to the whole anthropologic world.

THE ETHNOLOGIC AFFINITIES OF THE ANCIENT ETRUSCANS.—Starting out with the assumption that the ethnologic position of the ancient Etruscans is yet unsolved, Dr. Brinton contributes an important paper to the subject which is now reprinted from the *Proc. Am. Philos. Soc.*, Vol. XXVI, Oct. 25, 1889. The author compares the geographical position of the ancient Etruscans in Italy, their physical traits, culture, and above all such remains of their language as have been rescued from inscriptions of monuments and the few words handed down by the classical writers with the like features of the Kabyles of Algiers, and with their parent stem the ancient Libyans, and advances cogent reasons for considering that all are genetically related. His conclusions are categorically stated as follows:

1. The uniform testimony of the ancient writers and of their own traditions asserts that the Etruscans came across the sea from the south and established their first settlement on Italian soil near Tarquinii; this historic testimony is corroborated by the preponderance of archæologic evidence as yet brought forward.

2. Physically the Etruscans were a people of lofty stature, of the blonde type, with dolichocephalic heads. In these traits they corresponded precisely with the blonde type of the ancient Libyans, represented by the modern Berbers and the Guanches, the only blonde people to the south.

3. In the position assigned to woman and in the system of federal government the Etruscans were totally different from the Greeks, Orientals, and Turanians; but were in entire accord with the Libyans.

4. The phonetics, grammatical plan, vocabulary, numerals, and proper names of the Etruscan tongue present many and close analogies with the Libyan dialects, ancient and modern.

5. Linguistic science, therefore, concurs with tradition, archæology, sociologic traits, and anthropologic evidence in assigning a genetic relationship of the Etruscans to the Libyan family.

H. W. HENSHAW.

**NOTES ON COUNTING AND MEASURING AMONG THE
ESKIMO OF POINT BARROW.***

BY JOHN MURDOCH.

From September, 1881, to August, 1883, the writer was stationed in the immediate neighborhood of the large Eskimo villages at Cape Smyth and Point Barrow, Arctic Alaska, as a member of the International Polar Expedition, and had the good fortune to become intimately acquainted with a large number of their interesting inhabitants.

These Eskimo have had comparatively little intercourse with civilized men, as it is only within the last thirty-five years, or since the time when H. M. S. "Plover" passed two winters at Point Barrow as a depot ship, during the great Franklin search expeditions, that the American whalers have resorted to that region. Before the time of the Franklin search they had seen white men upon only two occasions, namely, when Elson, in the "Blossom's" barge, discovered and named Point Barrow, in 1826, and when Thomas Simpson, coming from the Mackenzie river, reached the same point in 1837.

Consequently they were but little changed from their primitive condition of culture, and retained their language almost in its original purity. In the process of collecting linguistic material among them, some interesting points were discovered in regard to their methods of counting and measuring, and these have been brought together in the present paper.

The language spoken at Point Barrow is sufficiently like that of the Greenlanders and other eastern Eskimo to be readily understood by them. This fact has been already pointed out by various writers. So far as I have been able to ascertain, the chief phonetic difference between the two dialects, apart from the fact that the vowel sounds are frequently different in words otherwise identical, appears to be that a surd consonant in Greenlandic, especially at the end of the word, is represented by the cognate nasal at Point Barrow, and that the so-called "fricative lingual" *ss* (pronounced *sh* or like the

* Read before the Society, December 4, 1888.

French/) of the Greenlandic becomes a true rolled *r*. Bearing these phonetic changes in mind, the resemblance of the Point Barrow system of numeration to that of the other dialects is very striking.

It was not easy to obtain any accurate information about the numeral system of these people, since in ordinary conversation they are not in the habit of specifying any numbers above five. Six and all higher numbers are ordinarily spoken of as *amadráktók*—"many." The same has been noticed among other Eskimo. For example, Captain Parry speaks of "the imperfect arithmetic of these people (the natives of Fury and Hecla Straits), which resolves every number above ten into one comprehensive word" (Second Voyage, p. 549).

They have, however, a series of numerals running at least as high as one hundred, most of which seem to be but rarely used. This agrees with the observations of Pastor Brodbeck among the East Greenlanders in 1882—"Zählen können die heidnischen Grönländer nur mangelhaft, über 20 hinaus versteigen sie nicht gern" (Nach Osten, p. 42). Those most frequently used are the words for ten, fifteen, and twenty. We did not succeed in collecting many of the other high numerals, and many of them appear to be somewhat cumbrous periphrases, which might be invented on the spur of the moment for expressing quantities which were appreciated, but for which there existed no single definite word.

The first five of the numerals and the word for ten are essentially the same as what are called the "real numerals" in the Greenland dialect, and the remainder appear to be made by repeating these numerals in connection with "part-words" (*theilwörter*), which indicate on which hand or foot the counting is done (see Kleinschmidt, *Groenlandische Grammatik*, § 42, p. 37). Together they form the series of cardinal numerals, which, as far as we could learn, are used only in concrete numbers, in the sense of numeral adjectives. The "real numerals" are:

- | | | | |
|---------------|------------------|-------------|-----------|
| 1. Ata'uzik, | corresponding to | Greenlandic | atausek. |
| 2. Ma'dro, | " | " | mardluk. |
| 3. Pi'ñasun, | " | " | pingasut. |
| 4. Si'saman, | " | " | sisamat. |
| 5. Tū'dlemūt, | " | " | tatdlimat |
| 10. Kodlin, | " | " | kulit. |

The "part-words" were not obtained very accurately, and are used in a somewhat different way from the Greenland method. Akbiniġin, or akbiniġin, appears to be a form of arfinek "on the second hand," but seems to have a more generalized meaning—*i. e.*, "on the next hand or foot." Six is therefore expressed in full "atautyimiñ akbiniġin tudlimūt(t)," "five (and) once on the next" (or if tudlimūt is derived, as has been suggested, from talek, the arm, "one hand and once on the next"), or "atautyimiñ akbi'niġin," or simply "akbi'niġin," when a Greenlander would say "arfinek-atausek, once on the next hand." In the same manner seven is "twice on the next," "madro'niñ akbi'niġin," and eight "three times on the next," "piñas'uniñ akbi'niġin." Nine, however, is formed differently, being kodlinqai'la, which appears to mean "that which has not its ten." Ten, kod'lin (kultit) is supposed to be derived from kut or kule, "the upper part," referring to the number of digits on the hands of a man.

The intermediate phrases "one on the first foot," &c., for eleven, twelve, and so on, were never heard, but instead of "five on the foot" for fifteen (made in Greenlandic with the "part-word" *arkanek* or *isigkane*) we found what appears to be a "real numeral" *akimi'a*, not occurring in the other dialects. From this word is sometimes made a word for fourteen, *akimixotaityufia*, "I have not fifteen." Twenty, *inyui'na* means "a man completed" (from *i'nu* [G. inuk] a man, and *inârpâ* to complete it), meaning that in counting twenty we use all the fingers and toes of one man. The expression in Greenland is slightly different from this, being *inuk nâvdlugo*, "a man come to an end." Twenty-five and thirty are "inyui'na tudlimûniñ akbini'diġin," "twenty and five times on the next," and "inyui'na kodliniñ akbini'diġin," twenty (and) ten times," &c. Thirty-five is "inyui'na akim'iamis aipâlin," "twenty accompanied by one fifteen times." Forty is "two twenties," *madro inyui'na* or "madrolipi'a." The last part of the latter word appears again in *tû'dlimûbipi'a*, one hundred, and perhaps is another phrase for "twenty." In the word for 100 the first part is the "subjective" or possessive form of *tû'dlimût*, five. The expressions in Greenlandic and other Eskimo dialects for these higher numbers are very different, which is pretty strong evidence that they have been developed since the separation of the Eskimo into their different branches. For example, in Greenlandic twenty-five is

inûp aipagsâne tatilimat, "five on the second man," and thirty is "ten on the second man," "*inûp aipagssane kulit*." In the Mackenzie dialect these two numbers are respectively *iglut talle-matopk* and *innok kpolinik-tchikpalik*.

On the other hand, the "real numerals" are wonderfully alike in all the vocabularies that have been collected, showing that before their separation the Eskimo were in the habit of reckoning at least to five.

It is evident from the cumbrous forms of the higher numerals that any arithmetical processes are difficult if not impossible. Mr. Richard Cull, in an article describing three Eskimo brought to England from Cumberland Gulf, in 1854 (published in the *Journal of the Ethnological Society of London*, v. 5, 1856, pp. 215-225), goes to work quite elaborately to use the numerals he learned from them in various arithmetical processes. He shows that addition and subtraction, and even multiplication and division, can be performed with these numerals, but the processes are exceedingly cumbersome, and, so far as I can learn, entirely foreign to Eskimo modes of thought.

The Point Barrow natives, however, appear capable of a sort of crude addition, since in counting objects they divide them into groups of five and obtain the sum total from the number of these groups. In counting up to five, the ordinal numerals are used, as in the other dialects. With the exception of *ai'pa*, "second," which, as in Greenlandic, means "his companion" (viz., the companion of the first), these are the cardinal numbers with the "suffix" of the third person, which indicates that the word to which it is applied belongs to something else. Kleinschmidt's explanation of this usage is that each ordinal is supposed to be the property of the preceding. For instance, third is "[the two] its third," fourth is "[the three] their fourth," and so on. "First," then, in the Point Barrow dialect, must mean "their first," referring to those that follow. In Greenlandic and other dialects a different word is used for first, namely, *sujugdlek* (with its dialectic variants), "the foremost." This word is not easily recognized in the form in which it is found at Point Barrow, *sibwudli*, where we only heard it used as the name of the star Arcturus, but the form of the word, *tçivulepk* [*tsivulek*], in the Mackenzie River dialect, connects the two widely distant forms.

The ordinals at Point Barrow are as follows :

Atau'zia, first.

Ai'pa, second (Gr., aipâ).

Piñayua, third (pingajuat).

Si'sama, fourth (sisamât).

Tûdlima, fifth (tatdlimât).

The question "How many?" is frequently asked in the form "How many times?" [sc. is the object repeated], using the *Modalis* "kapsi'niñ." The numeral in the answer is then in the same case, "atau'tyimiñ," "madro'niñ," &c.

Methods of measuring space appear to be in the most primitive state. Our vocabulary contains no words indicating any standard of length or of size, and there appear to be none in use among other Eskimo. Of late years, however, in their dealings with the whites the Point Barrow people have learned to measure calico, drilling, &c., by the fathom—that is, the length from tip to tip of the out-stretched arms.

Time is measured by the sun when it is visible, or by some of the stars at night. For instance, they say "We started when the sun was yonder (in the heavens) and travelled till it was yonder." Arc-turus, Sibwu'dli, is the time-piece of the seal-netters. When this star has passed over to the east they know that dawn is at hand and that netting is nearly over.

The length of a journey is reckoned by the number of "sleeps" (compare Parry, 2d Voyage, p. 556), and time is sometimes reckoned by the moon. For instance, they told us that "when this moon is gone and the next moon is little the whales will come."

We learned three names for seasons of the year—u'kio, winter, and u'piña and upiñaksa, warm weather. These words correspond to the Greenlandic upernâk, spring, and upernagssak, early spring.

Dr. John Simpson, R. N., who was the surgeon of the depot ship "Plover," and who published a very accurate sketch of the Eskimo of Point Barrow ("Observations on the Western Eskimo and the Country They Inhabit," originally printed as an appendix to the report of the commander of the "Plover" in the Parliamentary Reports for 1855, and reprinted in "A Selection of Papers on Arctic Geography and Ethnology," prepared by the Royal Geographical Society for the English Arctic Expedition in 1875, pp. 233-275), states that the year is divided into four seasons, and the names we

obtained correspond to those he gives for "late winter" and "early summer," or spring and summer.

We obtained with some difficulty the names of nine moons or lunar months of the year, but were told that for the rest of the year "there was no moon, only the sun." Dr. Simpson, however, obtained names for all twelve moons. The names of these moons were given differently by different informants, and do not wholly agree with those given by Simpson. It is quite likely that they are not invariable, and may be going out of general use. They begin to reckon the months from the time when the women begin sewing upon deer-skins, in the autumn, according to Simpson, starting with the first new moon after Elson Bay freezes over. They are as follows:

1. Su'dlivwiñ (Shud'-le-wing, Simpson), "the time for working—i. e., sewing."

2. Su'dlivwiñ ai'pa (shudlewing aipa), "the second time for sewing," or su'dlivwiñ kiñu'lia, "the succeeding sewing-time."

3. Kaibwid-wi (Kai-wig'-win), roughly speaking, December, the time of the great dances. Dr. Simpson's form of this name, which he translates "rejoicing," appears to be more correct than the one obtained by us, since "kaiwi'gwiñ" (from Gr. kavigpok) would mean "the time for going round in a circle" (as in the dance). The name probably should be translated "the time for dancing."

4. Ida'sugaru (Ir-ra-shu'-ga-run, "great cold") is the dark mid-winter moon, at the end of which the sun comes back—about January 23. The name appears to be derived from G. issik, cold; but I have been unable to analyze the compound. It is also called sũkũnyatyia (sha-ke-nát-si-a), "little sun," and sũkũnyasugaru.

5. Audlãktovwiñ (au-lak'-to-win), "the time for starting out" (to the deer-hunt), from audlãkto, to start. I am confident that Simpson was wrong in placing this moon before the preceding, as the deer-hunting parties certainly do not start till the February moon after the sun has returned.

6. Sũksilãbwi (e-sek-si-la'-wing), the next moon (March). This word, of which Doctor Simpson's form appears to be more correct than ours, seems to mean "the time for starting to come home."

7. Umisũrbwiñ (kat-tet-ã-wak, returning for whales), "the time for making ready the boats" (April).

8. Kaũkerbwiñ (ka-wait-piv'-i-en, birds arrive) (May) appears to mean "the time for fowling," from an apparent variant of kaũwe, fowl.

9. Yögniabwiñ (ka-wai-niv'-i-en, birds hatched), the time for bringing forth—i. e., laying eggs" (June).

As already stated, we learned no names for the other three moons.

They have definite words for to-day, and several preceding and following days. "To-day" is *kûñmû'mi* (there are other expressions, but this was the one commonly used in their intercourse with us). This word, which is evidently in what Kleinschmidt calls the *localis* case, does not appear in Greenlandic, where the expression used is *uodlume*, "in the [present] day." "To-morrow" is *ublaxo* or, perhaps more properly, *ublákun* (literally, "in the morning," a curious coincidence with the German "*morgen*"), and "yesterday," *unûñ-mûn* (literally, "when it was evening"). "Day before yesterday" and "day after to-morrow" are both called by the same name, *ikpû'ksa* (which is the same as the Greenlandic *igpagssak*, "yesterday"), and the third day from the present either way, with all preceding or following days for a short period, are called *isfa*. This is the same as the Greenlandic *ivsak*, "some days ago." For long periods in the past (we were given to understand more than four years ago) they say *aipâni* (literally, "in the other [sc. time]"). For very ancient times, beyond the memory of living man, they say *adrâni*. Future time was generally referred to as *nanâko*, *nanâkun*, "by-and-by," or when some expected event, like the going of the ice or the coming of the ships, should happen.

It will be seen that the expressions which they use for past time are too vague to render it possible to learn the date of any event in their history or traditions, unless it can be referred to the time of the Plover's visit, beyond which we have no well-defined date with which they are acquainted.

THE ABORIGINAL BARK-PEELER.—In several archæological museums of Europe, notably in the Royal Museum, in Copenhagen, implements of bone are to be seen, often made of a rib, whose function has not been known. The implement referred to is sharpened to a wedge-shaped edge at the lower extremity, the body is slightly bent along its entire length, and the upper end is rounded for a handle.

Implements of precisely similar form are now in use by the Indians of the Pacific coast of America, from Oregon to Alaska, for peeling bark from the cedar trees. Doubtless similar tools were formerly in

use in the birch-bark country and in South and Central America, where a kind of rude tapa cloth was beaten from the bark of the lace-bark tree (*Lagetta linearia*).

One specimen from the Tulalip Agency, in Washington Territory, is made of elk antler, sixteen inches long and sharpened at either end. The Indians of Queen Charlotte Islands and the adjoining mainland employ a great many smaller peelers to take off large slabs of bark in an unbroken condition for the roofs of their houses. These implements are less than a foot long and are made of the ribs of the deer.

The process of bark-peeling is a very ingenious one. A tree is hacked around quite through the bark in furrows about four feet apart. A vertical slit is also made. Then, by means of a series of the peelers, the bark is lifted from the tree and kept in flat form by a series of plugs and props until it dries. It remains flat after drying and is cut into sections suitable for shingles. For taking off the bark to be made into cords, baskets, cinctures, etc., the same amount of shaping is not necessary, but the peeler is universally used in separating the bark. The birch-bark canoe was formerly employed along our northern boundary wherever the birch tree was abundant, and it would be well to study the method of separating the bark from the trees.

O. T. MASON.

A VERY ANCIENT TOMAHAWK.—It is generally known that the iron tomahawk with a pipe on the blunt end is an invention of the white man, and counts for nothing in the study of primitive industries. In the ethnographic collection in Copenhagen is an antique-looking specimen with a blade of stone, resembling a diminutive specimen of our common two-ended pick, or more precisely, like one of those blades that are fitted into a socket on the handle and have no eyelet. The stone blade in question is lashed to a worm-eaten handle by means of rawhide just like an Eskimo pick. In the collection of the National Museum are two such blades without handles, both from New York. These furnish good evidence that the Copenhagen Museum specimen is an aboriginal tomahawk of the New York Indians, made before the iron ones were adopted. So far as we know it is the only perfect specimen in the world.

O. T. MASON.

A NEW LINGUISTIC FAMILY IN CALIFORNIA.

BY H. W. HENSHAW.

In delving among the rarer books and manuscripts which relate to the early history of America, the student not unfrequently comes across mention of tribes which have vanished and have left their names as the sole record of their existence. They died and left no monuments. Yet the researches of the archæologist may bring to light the stone implements such peoples made and used, and thus, to a limited degree, we may obtain glimpses of the culture state they lived in and form some idea of their mode of life.

Substantial as are such archæologic clews and important links as they are in reconstructing the past life of their former owners, they are by no means the most important of the heir-looms which research occasionally places in the hands of the student, since they throw little or no light upon the relationship of their owners and but dimly pierce the obscurity of their past history. Evidence of a much more satisfactory sort occasionally awaits the search of the linguistic student, when in turning the forgotten pages of history he finds vocabularies of the speech of vanished races, and is thus let in, as it were, to their inner selves, obtaining glimpses of their daily thought and religious ideas, and receiving hints of their relationship to other and it may be to living tribes. The latter may to some extent repeat their habits and peculiarities, and perhaps may furnish suggestions of their origin, migrations, etc. How clear an insight into such matters may be afforded by a study of the language of a people and how minute the details gathered by the linguistic student is to be seen by the remarkable results obtained by students of the Aryan languages, who are able to present a panorama of the daily life and thought of the old Aryans almost as though they had witnessed what they describe.

It is the purpose of the present paper to call attention to one of these vanished peoples, not because the facts to be given concerning it are either many or satisfactory, but with the primary purpose of recording such facts as are known, few and unsatisfactory though they be, and more important still of directing the attention of

students to the importance of searching for similar cases. In the present instance, indeed, even more may be hoped; for, while the people in question has been lost sight of for a hundred years or more, it is possible that a few survivors yet remain, and it is to be hoped that this fact once known the zeal of investigators may be stimulated and new and richer gleanings be added to the small store already harvested.

The people I refer to are a tribe known by the name Esselen or Ecclemachs, and formerly lived in California, to the east and south of the Monterey Bay, and with other neighboring tribes were gathered into the San Carlos Mission of Monterey, in 1770.

The first clew to the existence of a group of California Indians different from any recognized by recent students was obtained by Mr. Curtin, of the Bureau of Ethnology, from the rare collection of newspaper articles by Alexander Taylor. Though not a learned man, Taylor was an indefatigable student and reader, as well as an assiduous collector of Indian lore. Between the years 1860 to 1863 he published in the *California Farmer*, a weekly paper, all the material bearing upon California Indians he himself was able to gather and, as well, copious notes and extracts from the Mission records and from such of the early writers as he had access to. The result is a mass of material badly arranged, or, more properly, not arranged at all, illy digested and not always wisely selected, but still forming a contribution to the subject neither to be despised nor to be overlooked by the student of to-day. This author copies two vocabularies, one from Galiano, the other from La Perouse, and a comparison of the 39 words they contain seemed to show that here was an absolutely distinct linguistic family which had been entirely overlooked. The early date at which these vocabularies were taken, 1786 and 1792, and the fact that the Indians appear not to have been seen by any subsequent investigator, seemed to negative the hope that any of them might still survive. The doubt of there being any survivors seemed to be strengthened by the fact that Taylor visited Monterey in 1856 and took a vocabulary of the supposed "Eselenes," which, however, unfortunately turns out to represent the neighboring Rumsien language of which there are a number of good vocabularies extant. As the writer was about to visit the west coast for the purpose of linguistic investigations, the rediscovery of the lost Esselen tribe was made a prime object of the trip. For this, as well as for other linguistic purposes, an exhaustive search was made

through the counties of Marin and Monterey, to the north and south of San Francisco. While some very interesting linguistic results were obtained, some time passed before any clew to the Esselen people was secured.

It is a melancholy fact that in middle California the Indians have almost wholly disappeared. Here and there upon the outskirts of some town or in the nooks of some remote cañon of the foothills is still left an occasional Indian, man or woman, more rarely a family, whose identity, however, is so swallowed up by the prevailing Mexican type that one may spend days in a town inquiring for Indians without finding a person who chances to be acquainted with an aborigine. There are many Mexicans in middle and southern California who socially and physically are not a whit superior to the Indian, and in the motley throng the occasional Indian passes unnoticed except by the few. Their identity is the more readily lost because all of them, without exception, speak the Mexican dialect of Spanish, and never by any chance let fall in public a word of their own language; and indeed why should they? They are now so few in number that the old people rarely have a chance to converse together in their native tongue, while the young, who are mostly half-breeds, associate chiefly with the Mexicans and never learn the language of their fathers. Indeed it is a fact that in a number of instances the children of Indian women heard their mother's language for the first time when she repeated words and phrases to me for the purpose of notation.

Failing to discover anyone in San Francisco who knew of the whereabouts of Indians in either counties above mentioned, I set out for the vicinity of San Rafael Mission, 75 miles to the north. Knowing how tenaciously the Indians cling to the neighborhood of their former home, I selected this as the most likely spot to find any survivors. Not a single Indian, however, lives in or near the town, nor could I learn of any in the neighboring towns; when finally I heard of the existence of a few it was on the coast to the north, near the entrance of Tomales Bay. Here I found several men and two women, from one of whom I obtained an excellent vocabulary of the dialect spoken at the Mission. With this I was obliged to rest content, as none of the Indians on the Bay knew of others or were aware of the existence of any dialect but the one I obtained. The interest attaching to the language of this locality is due to the fact that its relationship has been the subject of discussion. By some

scholars it has been assumed that one linguistic family occupied the peninsula north of San Francisco Bay and the whole country coast-wise for a considerable distance south and as far east as the headwaters of the Moquelumne, Calaveras, Tuolumne, Merced, and others. A comparison of vocabularies, now in possession of the Bureau, by Mr. Curtin and myself, however, had raised doubts as to the correctness of this conclusion. As the result of a study of the vocabularies obtained at Tomales Bay with the others from this region in possession of the Bureau, and those subsequently obtained at the south, I am now convinced that the area in question was formerly occupied by two entirely distinct families.

Subsequently I journeyed to the southward and visited Santa Cruz, where formerly was another old mission. Upon the outskirts of this town and almost in the shadow of the church—the officiating priest of which told me there were absolutely no Indians in the neighborhood—I found a little colony of Indians and half-breeds who had a respectable knowledge of the dialects formerly spoken by the Indians of the locality. To every Indian I met I repeated word for word the Esselen vocabularies of Galiano and Lamanon, but none of them recognized the words as of a language they ever heard spoken. Disappointed, though by no means disheartened, I turned to Monterey as the Mecca of my hopes, as there I expected to find a considerable number of the once numerous old Mission Indians still clinging to the land formerly filled by their fathers. On the contrary, nearly all the Indians have disappeared and a number of days passed before I found myself face to face with an aborigine; at the present time there are probably not more than half a dozen pure bloods found anywhere in this locality. One of the number, an old woman of perhaps 65, proved an honest and willing subject and she herself volunteered the information I had so long sought. While mentioning the names of the rancherias formerly about the mission, she spoke of the Esselen tribe as a people who lived to the east and south of the Bay and whose language differed entirely from her own, the Rumsien. In reply to my eager request to speak a word or two of the language she said that if I would give her time to think she was certain of her ability to do so, as in early life she had mingled much with the tribe, her father having married an Esselen woman. Believing I had found the long-desired clew I repeated the Esselen numerals as given by Galiano and she at once recognized the words for one and three. As the result of much hard thinking for several

days, she succeeded, with the help of a second old woman, in recalling over 100 words and some 50 short phrases of the language—a priceless boon to the linguistic student. Though their study is not yet completed they have served to dispel any doubt as to the distinctness of the stock they represent.

Guided by the directions of old Eulalia, I subsequently visited the Salinas Valley to the south, in search of two women who had married Mexicans and who she said were of Esselen blood. The marriage of Mexicans with Indians is usually a very informal sort of marriage, and the tie is usually dissolved on short notice at the option of one or both parties. Accordingly my endeavor to discover these women by hunting up their respective husbands proved a wild-goose chase indeed. The Mexican husband was not hard to find, and from him I could always learn the name and whereabouts of his successor, only to discover that the wife had migrated to another settlement or taken up her abode in some distant cañon. After much search I found both women, but alas for my hopes, neither remembered a word of their own language. At least so they said and I was compelled reluctantly to believe them. Both claimed to have lived with the Rumsien tribe so long as to have forgotten their own tongue.

However, my search was not entirely unrewarded, for living in the same house with one of them was an aged and blind Indian who also spoke the Rumsien tongue, but who recalled a few words of Esselen and who verified quite a number of those given me by the Monterey woman. In addition he gave some valuable facts as to the habitat of the tribe. He also told me that five years before an Esselen man lived near the adjoining town of Cayucas who really spoke the language, not merely a few words of it, but a sufficient number to converse. He was the last one who did so, so far as he knew. This Esselen went south towards Santa Barbara and had not been heard of since. As I myself was in Santa Barbara in 1884 and made most careful inquiry as to all the Indians of that vicinity—and there are very few of them—it is only too probable that this, the last survivor of the Esselen people who spoke his own language has gone the way of the rest. As the result, therefore, of my investigations I was able to collect 110 words and 68 phrases and sentences of this almost extinct language. Singularly enough these were obtained from the lips of an alien people—a sad commentary upon the fate that has overtaken some of the American tribes.

OMAHA RELIGIOUS PRACTICES.—At the meeting of the Society November 5, 1889, Mr. J. Owen Dorsey read an important paper on the above subject.

Mr. Dorsey began with an account of the Omaha invocation to the sun, and gave a free translation of the usual formula employed. Next came a description of trapping practices. Tobacco was presented and prayers were made to the game, trap, medicine or charm, pack-strap, chief tent-pole, etc., each object thus addressed being personified.

The Omahas believed in different gods or mysterious powers before they learned of our Supreme God, the God of monotheism. This is in accord with some of the statements of the late S. R. Riggs concerning the Dakotas, and it agrees with what Mr. Dorsey had learned from the Ponkas in 1872-'73.

The concluding part of the paper treated of personal mystery decorations, and was illustrated by original sketches painted by an Omaha. Some of these decorations were worn on garments, others appeared on tents. The use of such decorations was restricted to members of the different orders of shamans.

This paper will be published in full in the 8th Annual Report of the Bureau of Ethnology.

H. W. HENSHAW.

ESKIMO OR INDIAN?—At the meeting of the Swedish Anthropological and Geographical Society on October 10, 1888, a paper was read by E. Dahlgren on recent investigations in regard to the voyages of the old Norsemen to Vinland. The paper was chiefly a resumé of Professor Storm's "Studier over Vinlandsreiserne, Vinlands Geografi og Ethnografi."

To Professor Storm's opinion, quoted by the speaker, that the "Skrälings" met by the Norsemen in America were not Eskimo but Indians (Micmacs and Beothuks), Baron Nordenskiöld replied that he was convinced from his personal acquaintance with Eskimo, as well as from a comprehensive study of the older Arctic literature, that the "Skrälings" could be nothing but Eskimo. (*Ymer*, v. 18, pp. xvii-xix.)

JOHN MURDOCH.

THE THUNDER-BIRD AMONGST THE ALGONKINS.

BY A. F. CHAMBERLAIN.

The interesting article of Rev. Myron Eels in Vol. ii, pp. 329-336, has suggested a brief discussion of the same subject with regard to the tribes of Algonkian stock amongst which the belief in the thunder-bird appears to be very wide-spread. It is found with the Crees of the Canadian Northwest and amongst some of the tribes of Micmac lineage dwelling near the coast of the Atlantic, on the shores of Hudson's Bay, and in the States on the southern banks of Lake Superior. The investigation of this peculiar belief must therefore cover the whole Algonkian region.

The Crees believe that certain divine birds cause the lightning by the flashings of their eyes, and with their wings make the noise of thunder. The thunderbolts are the "invisible and flaming arrows shot by these birds." Hind¹ speaks of the Plain Indians of the Northwest as "anxious and timid during the roll of thunder, invoking the Great Bird by whose flapping wings they suppose it to be produced, or crouching from the blink of his all-penetrating eye, which they allege is the lightning's flash." Cognate is the belief of the Blackfeet that winds are caused by the flapping of the wings of a great bird in the mountains.²

Among the Algonkian tribes of the Lake Superior region the same, or similar, beliefs are current. Rev. John McLean³ informs us that the Pottowattamies look on one of the high mountain peaks at Thunder Bay as the abode of the thunder, and that at one time a nest containing the young thunder-birds was there discovered by them.

From Rev. E. F. Wilson⁴ we learn that the Ottawas believed the thunder was "a great bird which flapped its wings on high over the

¹ Lacombe, Dict. de la Langue des Cris (1874), pp. 575, 262. The thunder-bird is called *piyesis*—i. e., "bird"—identical with Ojebway *binēsi*, Mississagua *pinēsi*, Illinois *pinēusen*, Ottawa *pināsi*, evidently a common Algonkian word for "bird."

² Narrative of Canad. Explor. Exped. of 1857, etc. (1860), ii, p. 144.

³ McLean. The Indians, their Manners and Customs (1889), p. 38.

⁴ Op. cit., p. 182.

⁵ Our Forest Children. N. S. No. 1 (July, 1889), p. 5.

earth to guard its inhabitants and to prevent those evil monsters hidden in the bowels of the earth from coming forth to injure them."

The existence of the thunder-bird tradition among the Ojebways of the northern shore of Lake Superior has been confirmed to the writer by information from Rev. Allen Salt, a Mississagua Indian, who has frequently visited that region. Regarding the Ojebways (Chippeways), Rev. Peter Jones¹ says "they consider the thunder to be a god in the shape of a great eagle that feeds upon serpents, which it takes from under the earth." Jones also relates (*Op. cit.*, p. 86) the story of an Indian who visited the nest of a thunder-bird on a high mountain. He saw bones of serpents scattered about, and noticed that "the bark of the young trees had been peeled off by the young thunders trying their arrows before going abroad to hunt serpents." At another time a party of Indians found a nest on the plains and put the young thunder-birds to death, after blinding them with their arrows (which, however, were shattered to pieces). All but one of the Indians were killed by the old birds on their return. The Ojebways believed that the home of the thunder-bird was on the top of a high mountain in the West, where it lays its eggs and hatches its young like an eagle. From time to time it sets forth into different parts of the earth to search for serpents, which form its food. When they saw a thunderbolt strike a tree these Indians believed that the thunder "had shot its fiery arrows at a serpent and caught it up in the twinkling of an eye." This belief is confirmed by the evidence of the early Jesuit missionary, Père Buteux², who relates it in very similar terms of the Algonkins of the north shore of the St. Lawrence in 1637. The thunder-bird is also known to the Ojebways of Red Lake, Minnesota, and figures in their pictographic records.³

While on a visit to the Mississaguas of Scugog, Ontario, in August, 1888, the writer was told by an aged woman of that tribe the following as the ancient belief of her people: "The thunder was caused by the flapping of the wings of the great thunder-bird that lived up in the sky, and the lightning was caused by the flashings of its eyes." A great storm of thunder and lightning was explained thus: "The young birds up there in the sky, they are so glad, they fly all about and make a great deal of thunder and lightning; like all young people, they are very restless." Not far from the village

¹ History of the Ojebway Indians (1861), p. 85.

² Relations des Jésuites, Année 1637, p. 53. See also Brinton, Myths of the New World (1876), p. 118.

³ Dr. W. J. Hoffmann, Amer. Anthropologist, i, 225.

of Scugog is buried a Mississagua chief, who just before he died called out that "I die! the thunders are coming!"

Amongst the Mississaguas and Ojebways, Indians were very often named after the "thunders." At Scugog one of the sons of Nāwīgishkōkē (sun in the center of the sky) was named Head Thunder, while another Indian was called Osāwānimtkī (Yellow Thunder). When the Rev. Peter Jones was named, the appellation conferred upon him was *Kakiwākwōnābi* (sacred waving-feathers), and his tutelary deity was the thunder. "He was given a war-club and a bunch of eagle-feathers, symbolical of the might and swiftness of the eagle-god of thunder."¹

Among the Passamaquoddy Indians the thunder-birds appear as men. Leland² has recorded a legend of this tribe of a man who was whirled up into the abode of the thunders and who told what he had there seen. The "thunders" were very like human beings, used bows and arrows, and had wings which could be removed or put on as occasion demanded. "The thunder is the sound of the wings of the men who fly above. The lightning we see is the fire and smoke of their pipes." These thunder-beings are always "trying to kill a big bird in the south." Here a recollection of the thunder-bird of other Algonkian people would seem to be present. Other "thunder stories" are given by Leland. According to another³ legend, the giant thunder-spirits, with eyebrows of stone and cheeks like rocks, dwell in Mount Katahdin. According to another Passamaquoddy legend,⁴ *Badawk*, the thunder, and *Psawk-tankapic*, the lightning, are brother and sister, whilst the distant rumbling before the thunder-crash is made by the child of *Badawk*, to whom his grandfather had fastened wings. This child was the offspring of *Badawk* and an Indian woman.

The Passamaquoddies also believe that the wind is caused by the motions of the wings of "a great bird called by them *Wochowsen* or *Wuchowsen*, meaning Wind-Blow or the Wind-Blower, who lives far to the north and sits upon a great rock at the end of the sky."⁵ This resembles the belief of the Blackfeet, noticed above.

Leland thinks⁶ that this "Wind-Blower is, as he appears in the Passamaquoddy tale, far more like the same bird of the Norsemen

¹ Journ. of Amer. Folk-lore, i, 152.

² Leland. Algonquin Legends of New England (1885), pp. 263-266.

³ Op. cit., p. 261.

⁴ Op. cit., p. 267.

⁵ Op. cit., p. 111.

⁶ Op. cit., p. 113. A similar account of Passamaquoddy beliefs is given in Journ. of Amer. Folk-Lore, ii, 230.

than the grotesque thunder-bird of the Western tribes." He seems inclined to explain many of the incidents in the "thunder stories" from Eskimo and from Norse mythology.

It may be, however, that the "wind-blower" and the "thunder-giants" are simply the "wind-bird" and the "thunder-birds" of the Western Algonkian tribes modified to suit circumstance and locality.

This view seems to be confirmed by the statement of Dr. F. V. Hayden¹ respecting the Crees: "Indeed, these Indians do not seem to fear any natural phenomena except thunder, which is supposed to be the screaming and flapping of the wings of a large bird, which they represent on their lodges as a great eagle. Wind is supposed to be produced by its flying, and flashes of lightning are caused by the light of the sun reflected from its white and golden plumage, and when strokes of lightning are felt they are thunder-stones cast down by this bird. All storms, tornadoes, etc., are caused by its wrath, and fair winds, calm and fine weather are regarded as tokens of its good humor." Here the wind-bird and the thunder-bird are regarded as one, and, as with the Ojebways, the bird takes on the form of an eagle in pictography, sculpture, and ornament. On the whole, the Algonkian beliefs respecting thunder seem more akin to those of the Siouan than of any other Indian peoples. With the Tetons the snake appears as the enemy of the thunder. Rev. J. Owen Dorsey² thus describes the Teton thunderers: "Some of these ancient people still dwell in the clouds. They have large, curved beaks, resembling bison humps; their voices are loud, they do not open their eyes wide except when they make lightning, and they have wings. They can kill various mysterious beings, as well as human beings. Their ancient foes were the giant rattlesnakes and the Un-kche-ghi-la or water monsters, whose bones are now found in the bluffs of Nebraska and Dakota." In the Omaha and Ponka myths thunder-men and thunder-birds appear, and the story of a visit to the nest of the thunder-bird is related.³

A close and detailed comparison of Siouan and Algonkian thunder stories and folk-lore would be of great interest and value, and might perhaps shed some light upon the relations of these two great peoples in the past.

¹ Transactions of Amer. Philos. Soc., vol. xii (N. S.), p. 245.

² Journal of Amer. Folk-Lore, ii, 135, 136. Compare the Onondaga tale of the serpent and the thunderers, *ib.*, i, 46.

³ Rev. J. Owen Dorsey, in Journ. of American Folk-Lore, i, 75-77.

VESPER HOURS OF THE STONE AGE.

BY JOHN G. BOURKE.

Although it is scarcely twenty-one years since I first crossed the Missouri river and began my acquaintance with the then wild tribes which roamed the valleys of its great tributaries and those of the Rio Grande, the Gila, and the Colorado, the interval has been extended enough to see them all not merely subjected to a condition of peace, but in most instances notably advanced in the path of civilization, their children trained in the white man's ways, and all traces of earlier modes of life fast fading into the haze of tradition.

It may, therefore, not be wholly without interest for an actual observer to describe, in a few words, some of the peculiar features of the closing hours of the Stone Age.

WEAPONS.

Most of the tribes herein considered were, to an insignificant degree, armed with muskets and rifles of old patterns, and occasionally with revolvers; but in both war and the chase they were mainly dependent upon weapons of their own manufacture.

Lances, arrows, and clubs were their principal offensive weapons. Stone scalping-knives of the broad, leaf-shaped pattern were still worn suspended from the neck.

Such fire-arms as had been obtained were invariably deprived of the iron butt-plate and one of the bands, and had the stocks scraped down in order to secure a minimum of weight.

Among the southwestern tribes the stocks were nearly always fantastically ornamented with brass-headed nails, and, when procurable, with the sacred green *chalchihuitl*, the gun being looked upon as "medicine." In this connection it may be well to observe that the Apaches of Arizona, New Mexico, and Sonora were among the first people in the world to reload the copper cartridge, which was done in a crude and laborious but efficient way by boring a hole in the base of the cylinder, inserting the old-fashioned percussion cap, and then refilling with powder.

The Apache never failed to provide himself with two willow shoots, thirty inches long and half an inch in diameter. These were hardened in hot ashes and then peeled. When shooting, the Apache would hold these sticks in his left hand, criss-cross, and make a rest for his fire-arm. This custom undoubtedly can be traced back to the first appearance of the Spanish arquebuse, which was always fired from such a rest.

Spears.—The lance was made of a staff selected from a suitable shoot of the *mescal* (century plant) or the *amole* (soap-weed), ten to twelve feet long. This was tipped with a flint barb, two or three inches in length by an inch in breadth, sometimes with serrated, sometimes with plain edges, fastened to the staff with sinew and gum.

An improvement upon this was made by inserting an old cavalry sabre into the same kind of a shaft and fixing it in place by drawing over it and allowing to dry the sexual organ of the domestic bull. The penetrative power of the lance was very marked; the young warriors constantly practiced with them, using the vertical giant cactus as a target.

Constant practice in the athletic game of *mushka*—which was practically a feat in lance-throwing, allied to the *chunke* found under various forms in so many parts of the American continent—added strength and dexterity to the arms of the Apache warriors. I have known them to pierce a human victim through the body at one thrust, and to transfix a *saguara*, or giant cactus, when advancing toward it on a run, from a point thirty to forty paces distant.

Arrows.—The stone tips of the Apache arrows comprehended all the forms known to archæologists: tongue and diamond shaped, straight or curved edges, serrated and non-serrated, with and without tangs. The Apache arrow, it should be stated, was composed of three parts: the reed, the stem, and the barb; the last affixed to the stem and the stem inserted into the reed, and both firmly held in place by ligatures of sinew. The stem was made of a hard wood called *kiong*, the shaft of the *carrizo* or *klokâ*. The use of sinew for securing the barb to the stem was believed to be based upon the fact that after the arrow had entered the body the warm blood flowing from the wound would soften and loosen the sinew, disengage the point, and increase the discomfort, pain, and danger of the victim.

Arrows intended simply for the killing of birds or small game were not always barbed, but were generally provided with a cross-piece about two inches below the tip.

Bows.—The bow was made almost always of the tough, elastic mountain mulberry, called, par excellence, *iltin* or bow-wood. Occasionally, the cedar was employed, but bows of horn, such as were to be seen among the Crows and other tribes of the Yellowstone region, were not to be found among the Apaches and their neighbors in Arizona.

The elasticity of the fiber was increased by liberal applications of bear or deer fat, and on rare occasions sinew was glued to the back for the same purpose.

The rule laid down by the Apaches for making their bows and arrows was the following: The length of the bow, or rather of the string, should be eight times the double span from thumb to little finger of the warrior using it. The curvature of the bow was determined almost entirely by individual strength or caprice. The shaft should equal in length the distance from the owner's armpit to the extremity of his thumbnail, measured on the inner side of his extended arm. The stem should project beyond the reed to a distance equal to the span covered by the thumb and index finger; this measurement included the barb, when made of sheet-iron. The iron barb itself should be as long as the thumb, from the end to the largest joint.

Stone arrow-heads were made preferably of obsidian (*dolguini*), next of chalcedony, lastly of pieces of beer bottles, but the process of manufacture was in each case the same, and consisted in chipping small fragments from the edges of suitable pieces of material, the chipping implement being a portion of hardened deer or elk horn, held in the right hand, the silicious stone being held in the left over a flap of buckskin to protect the fingers. Four or even five arrows could be discharged with a rapidity equal to or even greater than that of the firing of the same number of shots from the old-fashioned revolver.

I made it my business to determine exactly how many minutes were requisite for making a serviceable arrow-head. I singled out an Apache at random and stipulated that he should employ no tools of iron, but allowed him to gather from the ground such pieces of chalcedony as he pleased. He made a number of barbs, the time as recorded in my note-book being five, six, seven, and eight minutes. An expert would have completed the barbs in less time; but the problem was to determine how long it would take Apache Indians, whose village had been captured and destroyed by troops,

to provide themselves anew with weapons which would render them a menace to the scattered settlements of the frontier.

A good lance-head could not be perfected quite so soon. It could be made in a very short time, but in exactly how many minutes I am unable to say.

The Apaches have a myth which states that they overcame all the tribes in their path because the god, *To-va-dis-chinni* ("The Mist Rising from the Water"), placed them in a reed swamp and gave them pieces of obsidian as tips for their arrows. When read between the lines this myth relates an important truth: The Apaches did subdue or drive the other tribes before them on account of having better arrows, made as described.

Feathering.—At the lower end of the shaft were three half feathers of a hawk, fastened at each end with sinew, and in the direction of the axis. Each feather was as long as the inner seam of the second finger. No rule was found for placing the slot of the arrow, and in the same quiver I have found some in which the slot was in the same plane with the barb and in others perpendicular to it. These rules of measurement apply only to this particular class of arrows.

I am able, from my own recollection, to supply a number of illustrations of the great force with which the arrow was discharged, although a person for the first time observing an arrow coming towards him would be surprised at its apparent lethargy. In the summer of 1871 I was riding by the side of General Crook, on the summit of the elevated plateau known as the Mogollon Mountains, in Arizona. We were a short distance ahead of a large column of cavalry, and our immediate party was quite small. We ran into an Apache ambush; a number of arrows were discharged, two of them piercing pine trees to a depth of at least six inches. On another occasion a pine door, three-eighths of an inch thick, was penetrated. In July, 1870, a friend of mine, M. T. Kennedy, was mortally wounded by an Apache arrow which pierced his chest. The autopsy disclosed the fact that the arrow had no head.

The Apaches poisoned their arrows by rolling the stem in deer liver which an enraged rattlesnake had been made to bite. Their efficacy was more imaginary than real, because I have seen dogs, pigs, birds, horses, mules, and human beings wounded by such poisoned arrows and cannot recall the slightest increased danger or even the slightest additional inflammation from wounds made by them.

From their tenderest years Apache youth were trained with bow and arrow as with the lance, and, as a consequence, they attained a marvelous precision and rapidity in their use.

Slings.—In the use of the sling the Apaches were inferior to the Yumas, the reason being that the Yumas lived in the Colorado bottom which is filled with inexhaustible quantities of smooth, round, water-worn pebbles, admirably adapted for missiles.

The Apache were also expert in throwing stones, and often killed quail and turkeys with pebbles.

War-clubs.—The war-club of the Apache was an admirable weapon: a stone of suitable size and shape was sewed up in a cow's tail; then a space of four inches was left in the tail, and lastly, a round stick was sewed in to give strength and rigidity and to serve as a handle. The hair was left pendant, as it kept the hand from losing its hold when covered with human blood.

There was a radical difference between the Apache type of war-club and that of the *macan* of the Pimas, Maricopas, Yumas, Chemahuevis, Cocopahs, Opatas, and others. These *macanes*, or "potato-mashers," as the soldiers used to call them, are well described by their nickname. They were made, ordinarily, of the hard and close-grained wood of the mesquite and were a very effective weapon at close quarters.

By all these tribes the war-club was used in the same manner. Having located a *rancheria*, or village, of their enemies, they would surround it at night and when light first appeared in the east would raise a yell, shrill and unmistakable in its blood-curdling significance. The terror-stricken foe, rushing out pell-mell from their frail *jacales* were obliged to go down on their hands and knees to get out of the low openings. Crouched in this defenseless position, they would hardly have protruded their heads, when crack! would come the *macan* or war-club of the blood-thirsty assailants.

The Pimas and Maricopas used to be greatly addicted to plundering, in which they rivalled the Prussians. Almost the moment a hostile *rancheria* was attacked, pillaging began.

Blow-gun.—Inquiry was made among the Apaches in regard to another peculiar implement of war, the blow-gun of the tribes of the Orinoco and Essequibo, called "*cerbatana*" by the first Spanish explorers. It is not unlikely that the Apaches were once familiar with some form of the blow-gun, because their children occasionally make use of a toy constructed on the same principle; but nothing

definite on this head could be extracted from them. The blow-gun is still in use among the Cherokees of the mountains of North Carolina, from whom I obtained one last summer.

Boomerang.—By many, if not all the tribes surrounding the Apaches, the boomerang has been used from time immemorial in hunting the jack-rabbit and the field-rat. The Apache secures these toothsome viands by other means, and has no use for the boomerang. A form of the boomerang, studded with cruel teeth of obsidian, has been described by the early Spanish writers under the name of *maquahuitl*. It is said to have been a formidable war implement of the tribes of Anahuac and of those living near the Rio Grande, who could cut off a man's head with it. Not the slightest knowledge of this weapon exists among the Apaches of our day, and there are no references to it in their traditions or myths. But I heard something of a former use of the *maquahuitl* among the Rio Grande pueblos, and was assured by an old Indian, of Taos, New Mexico, that there was in that town at the time of my visit a weapon of this description, but the assertion was not verified. This old Indian insisted that a man's head could be cut off with this weapon, unconsciously corroborating the old Spanish story. Some of the bands of Siouan stock, on the Upper Missouri, retained a modification of the *maquahuitl* until within very recent times. It was a sort of tomahawk with long, sharp teeth of steel.

SHIELDS.

Shields, made of the hide of the buffalo's neck, were still in general use. A hole was dug in the ground and filled with hot embers, over which was strewn a layer of earth. A piece of hide of the requisite size and shape, or rather of a little larger size than was strictly necessary, because shrinkage had to be allowed for, was next pegged down to the ground, covering the improvised oven; then came another layer of earth and a top layer of hot coals; the effect being that the hide was slowly and evenly baked and hardened without being burned or cracked, and was made capable of resisting the old-fashioned, round, leaden pistol or musket bullet. When ornamented with the owner's totem and gaily decked with eagle feathers which serve the triple purpose of decoration, of frightening the enemy's horses, and, as the savages thought, of resisting arrows, the shield was pretty to look upon and a good means of protection from the missiles of past eras.

MORTARS, &C.

There were various forms of metates, mortars, and mullers for grinding acorns, mesquite beans, grass seeds, and paint. Frequently rocks *in situ*, provided with suitable depressions on their surface, were so used. Such were the rocks in the Gila Cañon, at the Bâ-bi-tui or Coyote Springs, in Pinal Creek, and elsewhere.

Stone mortars of great size were once to be found in Green Valley, where they formed the mills of the Apaches for grinding acorns so abundant there. Whether or not these belonged originally to a people of Pueblo type whom the Apaches displaced, cannot now be determined. The mortars themselves have all disappeared, having been carried off by American miners in which to crush auriferous rock.

No time need be spent in describing the stones used in heating vessels of grass and palmilla—those for heating the *ta-a-chi* or sweat baths, or those for cooking *mescal*—except to say that they were always selected from silicious rock, which would not split under high temperatures.

BORING-TOOL.

With an ordinary arrow held between the hands and revolved vertically the Apaches bored holes in beads. A bead of *chalchihuitl* was made in my presence under circumstances of great disadvantage in a trifle less than twenty-six minutes.

FIRE-STICK.

In the butt of the lance-staff a hole was bored and to it was attached by a string, the essential fire-stick, because matches were as yet scarcely known. The time required for making fire by this method, according to my personal observation, ranged from eight to forty-seven seconds; but the Apaches assured me that they could make it, under the most favorable circumstances, by running their hands down the vertical stick only once, which would occupy not quite two seconds as recorded on the watch. A sprinkling of sand increased friction and hastened the process very much. Two things are worthy of mention while speaking of this subject: the great volume of smoke that issued from the point of contact of the sticks and the total absence of flame.

AMULETS.

All the American aborigines used stones as amulets. The most familiar examples are the arrow and lance heads which had once

killed enemies, or, in the hands of the enemy, had failed to kill the owner himself. Two or three arrow-heads were appended to the necklace of human fingers which I secured during a fight with the Cheyennes of northern Wyoming during the winter of 1876, and which has since been deposited in the National Museum. The information obtained in regard to these was always vague and far from satisfactory, but better fortune attended my investigations into the nature and uses of the "medicine arrows" worn by the women among the Apaches and Pueblos. I have the only one of these ever given into the keeping of a civilized man. It had been worn for years by *Tze-go-ju-ni* ("Pretty Mouth"), an Apache squaw who claimed great skill as a midwife, and was in the habit of administering a pinch of powdered arrow in water in cases of painful gestation and protracted labor. She explained that whenever lightning happened to fell a pine tree on the top of a high mountain, the medicine men would hunt around to see if there was any rock at the foot of the blasted trunk which would yield fire when struck. Such quartz veins are, of course, common enough, and the only thing that remains to be done is to shape a piece of the stone into a lance-head.

One of these "medicine arrows" was seen by me in the Pueblo of Acoma, New Mexico, in 1886. The woman who owned it acknowledged that its uses were identical with those of the same amulet among the Apaches, but absolutely refused to sell or trade upon any terms.

Just such amulets, endowed with the same virtues, have been employed all over the world, in Europe as well as in Asia, in early times as well as in our own day.

A chapter of references to this topic has been compiled from various authorities in the course of my studies and will soon be published. I wish only to add, at this time, that the "elf shots" of the European peasantry may fairly be placed in the same category.

Garcilasso de la Vega, in his "Commentarios Reales," made the curious statement that in Peru, whenever lightning struck a tree, the priests were careful to mark the spot to prevent the people from approaching and incurring the displeasure of supernatural powers.

In the new light thrown upon this matter by *Tze-go-ju-ni*, it is not at all unlikely that Garcilasso de la Vega, who was less than thirteen years of age when he left Peru, was entirely in error, and that what the priests really intended to do in such cases was to preserve the stricken trees for the manufacture of amulets and talismans.

The worship of stones was still further developed among the Apaches. I have been taken by these Indians to one of their sacred caves in the Tonto Basin in which was a stone phallus; in another the medicine men had danced and sung around stalactites and stalagmites which yielded musical resonance under the sturdy blows of their clubs. I did not see this dance, but the natives who conducted me to the cave, and whom I found to be perfectly reliable, showed me the stones and the places where the medicine men stood.

The sacred stone-heaps described in all other parts of the world are frequent in Arizona where the Apaches call them "*tze-nachie*." I have prayed, cast stones upon these heaps, spat upon grass, blown my breath, and made a little backward jump precisely as the Apaches instructed me to do; but as this article has already exceeded the limits originally intended, and as it is trenching upon the more strictly religious side of Apache life, I will reserve further information for treatment under that head.

THE TONOCOTES OF SOUTH AMERICA.—One of the most numerous nations of Indians in the Tucuman region of Spanish South America were the so-called Tonocotes or Toconote tribes, mainly to be found near the upper parts of the rivers Salado and Vermepo. In some extraordinary manner their nation and their language seemed to have slipped out of the memory of all concerned until about the middle of last century Father Machoni, of the Society of Jesus, wrote his curious work on the so-called Lule and Tonocote language. Hervas, in his famous *Catálogo de les Lenguas*, has questioned the correctness of the hypothesis that Machoni's Tonocote represents the Tonocote of the early Missionary Fathers, &c., and it seems that Jolis, in his book on the Chaco, expressed the same opinion, and there the matter has pretty well rested until the present day. Late investigations, however, seem to point in another direction and confirm Hervas' and Jolis' doubts.

Machoni certainly does not say his dialect is Tonocote, he only mentions the fact that these Indians left Tucuman and went to the far north, and as he had discovered these strange Indians speaking a language very different from that of the surrounding Chaco nations, he allowed his readers to infer that it must be Lule-Tonocote. So far no so-called Lule-Tonocote grammars or vocabularies have turned up, and it is evident they had already been lost even before

Machoni's time, and so he started or rather allowed others to start the hypothesis that an unknown lost language must coincide with an unknown found language.

I have now been able to ascertain that the Tonocotes must have been Mataco Indians, tribes which still swarm in all the upper region of the Vermepo and Pilcomayo rivers, and that the original Lule tribes were so called by the Matacos because they found them occupying the country when they immigrated into it. Lule is a Mataco combined word meaning—the inhabitants. Lules were the hill-tribes of the Anconquija range and spoke *Cacan*, a language in process of being restored to the knowledge of South American philologists. Matacos, like all the Chaco dialects of the Abipon type, use prefixed particles mainly, Machoni's Lules and Tonocotes suffix them, so that the two groups belong to different families.

The above remarks are a summary of an essay I am preparing on the ethnology of the Argentine Republic, or rather of the basin of the River Plate. Hervas and Machoni's books are easily obtained and any one interesting himself in the subject can read up what those authors have to say about Lule-Tonocotes. It is very possible that Machoni's Lule-Tonocotes, together with the Vilela and Chulupí or Chunupí tribes, may be a remnant of the older race which occupied the country at the time of the great Caribic invasion some 2000 years ago.

Hoping you may find the above of some interest, I remain very truly yours,

SAM'L A. LAFONE QUEVEDE.

BUENOS AYRES, *October 29, 1889.*

ARROW-HEAD MAKING.—In *Ymer*, the journal of the Swedish Anthropological and Geographical Society of Stockholm (v. 18, 1888, pp. I, II), are notes on ethnographic observations made during a passage through the Straits of Magellan on the Swedish frigate *Vanadis*, by Dr. Hj. Stolpe.

One of the most interesting things in the article is the description of the manufacture of arrow-heads of glass obtained from bottles of European manufacture. “. . . the bit of glass is wrapped in the common cloak of guanaco-skin and roughly shaped by biting. The arrow-head is then finished by flaking with an albatross-bone.”

JOHN MURDOCH.

THE FIGHT WITH THE GIANT WITCH.*

BY GARRICK MALLERY.

This Abnaki myth or folk-tale was communicated to me by Mrs. W. Wallace Brown, of Calais, Maine, by whom and her husband (who for a number of years was superintendent of the Passamaquoddy branch of the Abnaki at its reservation) it was translated. They gave to me many other mythic tales of the tribe which, like this one, are very different in spirit from those published in Mr. Charles J. Leland's work entitled "Algonquin Legends," although that work deals exclusively with the Abnaki, and the Micmacs, their next neighbors and congeners. As these tribes together form but a small part of the Algonquin linguistic family, the title of the work, "Algonquin Legends," is much too comprehensive.

After two field-seasons spent among the two tribes mentioned, it was apparent to me that a full and unselected collection of their myths and tales would not exhibit the peculiarly harsh and violent character assigned to them by Mr. Leland, which peculiarity is explained by him on a theory of Scandinavian influence. The facts do not require any such explanation. The myths of those tribes are similar in their essential character, and indeed in many of their details, to those of other bodies of Indians throughout the northern and inland parts of the United States between whom and the Scandinavians contact has never been suggested. It is also a fact that the Abnaki and Micmac are now, and have been during historic times, more gentle than most of the Indian tribes.

In the present story the active work of poohegans or attendant daimons, translated as "guardian spirits," will be noticed, and their combats. They were generally animals, more properly the archetypes or ultimate progenitors of the particular animals. The one poohegan, whose name is, perhaps with too great metaphysical signification, translated "Thought," may refer to the crude idea of spiritual communication at a distance, which was common among the Indians and for which modern mystics have several terms.

* Read before the Society.

The information afforded by visions in dreams also appears. The word translated as "Fairy" is probably applicable to one of the "little people," which supernatural race is often the subject of western as of eastern story.

The daimon called "Disease" affords an illustration of the common Indian doctrine that all diseases were unnatural—that is, supernatural, and were the work of malign beings.

A PASSAMAQUODDY MYTH.

Many, many, long years ago, there dwelt in a large cave in the interior of a great mountain an old man who was a Keewauk-M'-telolen or Giant Witch.

Near the mountain was a large Indian village the chief of which was named Hass-ag-wauk, the Striped Squirrel. Every few days some of the chief's best warriors mysteriously disappeared from the tribe. Hass-ag-wauk soon became convinced that they had been killed by the Giant Witch and he called a council of all the noted witches who possessed the greatest power. They gathered together in a new strong wigwam made for that purpose. There were ten of them in all, named Quar-beet, the Beaver; Moosque, the Wood-worm; Quag-sis, the Fox; K'cheattosis, the Serpent; Eag-winn, the Loon; Cosque, the Crane; Moo-in, the Bear; Lox, the Devil; K'che-pelogan, the Eagle; Wabb-tek, the Wild-goose.

The great chief Hass-ag-wauk addressed the witches and told them that he hoped that they might be able to conquer the Giant Witch, and that if possible it must be done at once or his tribe would be exterminated. The witches resolved that they would commence the battle the next night and use their greatest powers to kill the Giant Witch. Now the Giant Witch could foretell all his troubles by his dreams, and on that very night he dreamed of all the plans which the witches contemplated for his destruction. Now all Indian witches have poohegans or guardian spirits. The Giant Witch sent one his poohegans, little Al-umusett or the Humming-bird, to the Chief Hass-ag-wauk telling him that it would not be fair to send ten to fight one, but that if he would send one witch at a time he would be pleased to meet them. The chief sent word in return that the witches would meet him in battle one at a time. The next night the witches met as appointed, as soon as the sun slept, and it was agreed that the Beaver should fight first. Now the Beaver had So-ga-lum or Rain for his poohegan and he caused a great

flood to come and fill up the cave where the Giant Witch lived and by this means hoped to drown him. But the Giant Witch had the power to change himself into a Sequapp Squatten or Lamper Eel and held fast on to the side of his cave and thus escaped. The Beaver, thinking that the Giant Witch was probably drowned, swam down into the cave and got caught in a k'pagu-teehegan or beaver-trap which the Giant Witch had purposely set for him. Thus the Beaver is conquered. The next witch to fight is Moosque, the Wood-worm, whose poohegan is Fire. The Wood-worm told Fire that he would bore a hole down into the cave that night and that on the next night he wanted Fire to go down into the hole and by this means burn the Giant Witch. The Wood-worm went to work and with his sharp head and by whirling himself around like a screw soon made a deep hole in the side of the mountain, but the Giant Witch knew what was going on and he sent his poohegan, Humming-bird, with a piece of cheequaqu-seque, punk, and put a plug in the hole so tight that the Wood-worm could not get back and the next night when Fire went into the hole he set fire to the punk and burnt up Moosque, the Wood-worm, and thus perished the second witch.

The next witch to fight was K'cheattosis, the Serpent. He had Hummewess, the Bee, for his poohegan. The Bee called all of the bees together and they went into the cave and swarmed all over the Giant Witch, which made him roar with pain; but he sent the Humming-bird and collected a lot of birch bark and set it on fire which made a dense smoke and stifled all the bees. After waiting some time the witch, Serpent, went into the cave to see if the bees had killed the Giant Witch, but he got caught in a dead-fall which the Giant Witch had prepared for him. The chief Hass-ag-wauk was now almost discouraged at having lost three of his best witches without accomplishing anything; but seven more remained. The next witch to fight was Quagsis, the Fox. His poohegan was K'seenoka, Disease, and he sent him to afflict the Giant Witch with all kinds of sickness and he was soon covered with sores and boils and every part of his body was filled with aches and pains, but he sent his poohegan, Humming-bird, to Quilip-hoit, the god of medicine, who gave him the plant Kee-kaywee-N'bisoon, which as soon as it was administered to the Giant Witch immediately cured him of all his diseases. The next witch to fight was Eagwin, the Loon, whose poohegan was T'ka-iou, Cold. In a short time the mountain was covered with snow and ice and the cave was filled with cold blasts

of wind, the frost cracked the trees and broke asunder the great stones. The Giant Witch suffered terribly, but did not become discouraged. He tried his magic stone and heated it red hot, but it was so cold that it had lost its power and could not help him. Alumusett, the Humming-bird, had both wings frozen and could not be sent on any more errands; but one of the Giant Witch's best poohegans was Lithuswagon or Thought, and he sent him like a flash to Sou-nessen, the South Wind, to come to his aid. In a short time the warm South Wind began to blow around the mountain, and the cold was obliged to disappear from the cave. The next witch to fight was Cosque, the Crane, whose poohegan was Kee-wauk, the Giant-with-a-heart-of-ice, who soon went to work with his big stone hatchet and chopped down all the trees and tore up the rocks and commenced to cut a large hole into the solid rocks in the side of the mountain, but the Giant Witch, now for the first time, let loose his great and terrible dog M'dasmoose, who barked so loudly and attacked Kee-wauk so fiercely that he was frightened off. The next witch to fight was Moooin, the Bear, whose poohegan was Badogiek, Thunder, and Pa-sock-way-tuck, Lightning. Soon a great thunder-storm took place which shook the whole mountain and a thunder-bolt split the mouth of the cave in two. The lightning flashed into the cave and nearly blinded the Giant Witch who was now terribly frightened for the first time and he cried with pain for he was badly burned by the lightning; but the Thunder and Lightning redoubled their strength and filled the cave with fire. The Giant Witch was now greatly alarmed and quickly sent the Humming-bird to summon Haplebemlo, the Great Bull-frog, to come to his aid. He soon came and spit out his great mouth full of water which nearly filled the cave and extinguished the fire and drove off Thunder and Lightning. The next witch to fight was Lox, the Indian devil. Now Lox was always a coward and when he learned of the misfortune of the other witches he cut off one of his big toes and when the great chief Hass-ag-wauk called him to go fight he made the excuse that he was lame and could not go. The next witch to fight was K'chee-pe-logan, the Eagle, whose poohegan was Applaus-um-luessit, the Whirl-wind. When he went to the cave of the Giant Witch with all his fury and violence and noise he awoke the Giant Witch who had been asleep and who at once k'pla-moosooke or lost his breath and was unable to speak, but he made signs to the Humming-bird to go for Cul-loo the chief of all

great birds, but the wind blew with such strength that the Humming-bird could not get out of the mouth of the cave but was always driven back again. The Giant Witch now sent his poohegan Thought, to command Cul-loo to come to his assistance. In a moment the Great Bird came and made such a great wind with his wings at the mouth of the cave that the power of the Whirl-wind was useless. The Chief Hass-ag-wauk now became discouraged as but one more witch remained to fight and this was Wabb-tek or Wild Goose, who was a very quiet and clever fellow and never quarreled with any one and was not regarded as a powerful warrior. Now the chief had a dream in which he saw a great giant, who stood before the mouth of the Giant Witch's cave and was so tall that he reached from the earth to the sky, and he said that all that all that was necessary to do to destroy the Giant Witch was to have some young woman to entice him out of his cave when he would lose his power and that he, the giant, would then kill him. The Chief Hass-ag-wauk told his dream to the witch Wabb-tek, Wild-goose, and ordered him to do as he had been told to do in the dream. Now the Wild-goose had for his poohegan Mickum-wiss or a Fairy, who changed himself into a beautiful young woman and went to the mouth of the cave and got up into a large hemlock tree and sang a song :

Come to me young man !
Come hear my sweet song !
Come out this beautiful evening—
Come on this beautiful mountain—
Come see the leaves so red !

The Giant Witch soon heard the singing and came to the mouth of the cave, and was so fascinated by the singing that he came out of the cave and saw a very beautiful young woman up in the tree who said to him, "W'litthodd m'on nachi-pen-equilin w'liketuqu he moos," "Please, kind old man, help me down this tree." As soon as he came near the tree Gloos-cup, the great king of all men, dodged from behind the tree and threw his stone hatchet at him and split his head open. Then Gloos-cup addressed the Giant Witch and told him, "You have been a wicked bad witch and have destroyed nearly all of the Chief Hass-ag-wauk's best warriors. Now speak once more and tell what you have done with the bones of your victims." The Giant Witch replied that in the hollow of that mountain could be found an immense heap of human bones which

was all that remained of what were once the great warriors of Hass-ag-wauk's tribe. As soon as he was dead Gloos-cup summoned together all the beasts of the forest and all the birds of the air to come together and eat the body of the Giant Witch. Then Gloos-cup ordered the beasts to go into the cave and bring forth the bones of the dead warriors, which they did; then told the birds to take each a bone in their mouths and pile them together at the village of the Chief Hass-ag-wauk. Then Gloos-cup ordered the Chief to build a wall of large stones around the heap of bones and cover them with wood and make equnak'n, the hot bath.

Then Gloos-cup set the wood on fire and commenced to sing his magic song. Then he ordered more wood to be put on the fire and water to be poured on the heated stones. Gloos-cup sang louder and faster until his voice skook the whole village and he ordered the people to close their ears or his voice would kill them. Then Gloos-cup redoubled his voice and the bones began to move by the heat and began to sizzle and make a peculiar sound. Then Gloos-cup sang his resurrection song in a low voice. At last the bones began to sing with Gloos-cup and he sprinkled on more water and the bones came together in their natural places and soon became natural human beings again. The people were amazed at Gloos-cup's power and the Chief Hassag-wauk gathered all the neighboring tribes together and celebrated the great event with the Resurrection feast which lasted for many days, and the tribe of Chief Hass-ag-wauk was never troubled by evil witches forever afterwards.

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H. W. HENSHAW.

OMAHA CLOTHING AND PERSONAL ORNAMENTS.

BY J. OWEN DORSEY.

The material for this article was collected by me on the Omaha reservation, in 1878-'80, and revised in the summer of 1882, with the assistance of two Omahas, two Crows, and the late Joseph La Flèche.

Garments were usually made by the women, while the men made their weapons.

MEN'S CLOTHING.

Some of the Omaha and Ponka (whose customs resemble those of the Omaha) have adopted the dress of the white men. The ancient dress consisted of buffalo robes, breech-cloths, leggings, and moccasins. Shirts were not worn. Blankets have been introduced by traders and the Indian Bureau. There is no distinction between the dress of dignitaries and that of the common people. Several kinds of face and head coverings were used. In cold weather they used to wear the *Te in-de ha wa-dha-ge*, a hat made of the black hair which grows on the face of the buffalo near the chin. This hat was worn over the head and face. Another protection for the face and ears was made of the skin of a wild cat. The skin was tanned and whitened.

Min-gha-san nin-du-dhi-se wa-dha-ge was a hat made of the feathers of the brant from the middle of the body to the tail-feathers inclusive. This hat was worn occasionally by those who went on the war-path and not at other times.

Ma-shu-pa-gdhan is a cap made of the tail-feathers of eagles. It extends down the back, nearly to the feet.

Khi-dha wa-dha-ge or *Khi-dha dha-ge* of the Omaha and Ponka (*Khū-yu-lañ-ge* of the Kansa), is a cap made of the entire eagle-skin.

Te-zhin-hin-de wa-dha-ge, a turban made of yarn and beads, is of modern origin, and is worn for ornament, as in the dances.

Ta-hin wa-gdhan, a head-dress used by the Omaha, Ponka, Iowa, and Oto, was made of a deer's tail ornamented with peacock's feathers and the rattles of snakes. This and the "Crow" were re-

wards of bravery and were worn during the *He-dhu-shka* and scalp dances.¹

Ka-ghe mi-gdhan or "Crow." This was made on two parallel sticks and was covered with porcupine work. On one side hung the *ibe* or tail of a crow, while from the other was suspended the tail of a coyote. Both sticks were fastened to a belt and projected out from the back of the wearer.

Masks were used by the young men when they entered lodges to beg. They were made of bladders softened by pulling with the hands, and they had holes for the mouth, eyes, and nostrils.

Belts were formerly made of any kind of skin procurable, as of the buffalo, deer, or antelope. Since the advent of the white man, these Indians have made two other kinds of belts, the *ha i-gdha-ze* and the *te-shin-hin-de i-pi-dha-ge*. The former is made of strands of *wa-han'* or yarn, which are interwoven. The latter is made of yarn in like manner, but with beads strung on as described by Dougherty in his account of the Omahas.²

"In the manufacture of this common and much admired article of dress, ten double threads are attached by one end to a small *wang* (*wahan'*, J. O. D.) or shreads of leather (*sic*), which is firmly stretched and fixed transversely to the work; each double thread is placed at such a distance from the adjoining ones as to give room for the beads. These are then strung on, one on each double thread. By this operation a transverse row of beads is formed upon the work parallel to the *wang*. This being done, the left double thread is passed to the right, not over and under, but through all the double threads, parallel to and in contact with the beads, and in this position occupies the situation of woof or filling; but its extremity is continued along on the right side of the work, so as to resume, in that portion of its length, the character of warp or chain. Another row of beads is now put on; after which the next left-hand double thread is passed through each of the others to the right of the work, as the previous one had been."

Breech-cloths were made of deer-skin or antelope-skin, but now a piece of an old blanket is generally used for that purpose.

Robes (*wa-in'*) were made during the winter, because the winter skins or *me-ha* had thick hair. The string for fastening the robe around the neck was called the *iñ-ke-gdhe-shitañ-ga*, a name now

¹ See p. 329, "Om. Soc.," in 3d Eth. Rept.

² In Long's Expedition to the Rocky Mts., Vol. I, p. 286-7.

given to buttons. Robes were worn with the hair out by chiefs and others on special occasions. These robes were often decorated on the smooth side with blue, red, and black lines, forming various designs, some of which referred to past events in the life of the wearer.

Mittens were made of buffalo hides that had thick hair, but now some of them are of elk-skin. They were short and rounded a little at the top. They were worn only by the aged men and women.

Foot Coverings.—Under the moccasins and next to the feet were the native *hin-be' ga'-win-ghe*, made of buffalo hair taken from the head, or of red grass which had been pulled in the hands till it became soft. This hair or grass was wrapped round and round (*ga-win'-ghe*) the feet previous to putting on the moccasins. Even when the grass became wet it was still a good covering. Since these Indians have encountered the white men they have in some cases adopted the socks and stockings, which they now call *hin-be ga-win-ghe*.

Moccasins were called *hin-be* or *han-be*. These are distinguished from those of other tribes by the shape of the sole, the number and positions of the *hin-be ga-she-gdhe* or tags on the moccasin heels, and by the *hin-be-di-ha* or flap next the ankle, as well as by the character of the designs of porcupine-work or bead-work on them.

The Ponka used to wear moccasins like those of the Omaha, but recently they have adopted the Dakota styles. An Omaha *hin-be-di-ha* is rounded at the ends next the toes and is about two and a half inches wide, extending nearly down to the sole of the moccasin. A Ponka *hin-be-di-ha* is angular at the ends next the toes and is not over one inch and a half in width. The flaps are turned up and tied around the ankles in bad weather. The Omaha omit the heel tags whenever they desire. Moccasins are generally made in the summer, as the hides of the buffalo slain during that season have little hair on them. When the women make the moccasins they pull off whatever hair there is on the hide, as they also do when they wish to make leggings or skins for tents.

The trail of an Indian has the following peculiarities: First, the sole of the moccasin by its shape marks the tribe of the wearer, except when the style has been borrowed from another tribe; secondly, the heel tags by their number and order furnish another criterion (the Omaha have three, one in the middle and one on each side; elsewhere we find two, equidistant from the middle of the heel;

another tribe has one in the middle and one on the right; still another, one in the middle and one on the left; some tribes have but one, and so on); thirdly, each tribe has its own style of turning the toes in walking. This is caused by the Indian mother who, when the child is in its cradle, ties its feet straight or otherwise between pieces of wood. Omaha and Ponka walk with the toes pointing straight ahead. The Dakota turn their toes in a little, and the Winnebago are exceedingly pigeon-toed. The Pawnee turn their toes out.

Sometimes over-moccasins were worn. The inner moccasins were thin, being made of elk or deer skin, but the outer ones were made of thick buffalo skin and were a few inches higher than the inner pair.

Leggings were worn by both sexes. When the women made them out of buffalo skins, they used to remove the hair. They put on them fringes of deer-skin. The strings for fastening the leggings to the belt were made of the skin of the elk, deer or buffalo.

Garters were of two kinds: The *hi-dha-win dhan* were made of a piece of hide cut lengthwise, or else of interwoven pieces of sinew on which beads were strung. They were the width of two fingers, and were wrapped twice around the legs with the ends dangling.

The *hi-dha win dan-pa* or short garters are as wide as three fingers. Men wear them if they are proud. They also form part of a woman's attire on festive occasions.

WOMEN'S CLOTHING.

In ancient times, the women wore the *ha u-na-zhin*, the *ha wa-te*, the *u-tan*, the *hin-be*, and the *wa-in*. The *ha unazhin* or skin shirt was made of the skin of the elk, deer, or antelope, and the *utan* or leggings were of similar material. The *ha wate* was a skin dress or skirt, made of elk or deer skin. The *wain* or robe was of buffalo hide. The moccasins were plain, without any porcupine work.

Since the coming of the pale faces, the Omaha and Ponka women have made a few changes in their attire, which now consists of a blanket or shawl, a chemise, a calico sacque, a skirt, and moccasins. The calico sacque is made with a cape hanging about a foot down the back. On this account no Ponka man would wear a sailor jacket in 1872-3, as its square turned-down collar resembled the woman's cape. Every woman wears a belt, to which is attached a

knife-sheath. The belt is worn straight around the waist by the Omaha women, but the Dakota women lower it in front, converting thereby the lower part of the sack into a stomacher, which serves as a pocket for carrying sundry articles.

Instead of collars, the Omaha and Ponka wore necklaces. Those worn by men were called, *wa-nan-p'in*. Necklaces of bears' claws are still used by a few men, and probably formed one of the ancient styles. There are several other styles, most of which have been introduced by the traders. Among these latter is one kind made of white shells perforated at the ends, such as are commonly found among the Dakota.

The woman's necklace is called *u-in' ga-zan-de* by the Ponka, and *u-in ga-zan-de* by the Omaha. This necklace is made by stringing (*ga-zan-de*) beads on horsehair, which is interwoven, the beads being arranged in different colors so as to form various designs, such as birds, arrows, and horses.

There were no pockets made in garments. But receptacles for articles were formed by fastening the belt around the robe, blanket or sacque, the belt forming the bottom of the "*u-ti-shi*," and the articles were then put within the garment. The robe or sacque was allowed to be full, or as white ladies term it, a "Garibaldi waist."

The Omaha and Ponka had no wigs. The one worn by the Ponka chief, Standing Bear, prior to 1879, was given to him (*fide* J. La Flèche) by the Yankton chief, Struck by the Ree, who used to wear it at councils and dances.

Plumes and eagle feathers when worn in the hair are marks of distinction for brave men. See the account of the reception of an infant into the deer gens of the Omaha, pp. 245-6, Om. Soc., in 3d Eth. Rept.

Head-bands were used by the women for keeping the hair out of their eyes. No man wore one except when he had a headache.

Earrings and pendants. A modern kind is the *pe u-ga-shke*, made of pewter. Several of them were worn in each ear.

Another kind is made of a species of white shell, having three names, "the real beads," "the real earrings," and "the real necklace," the latter name having been given because necklaces are made out of them. I have seen oblong pieces of clam shell about two inches long so used by the Ponka, who call them *ga-shpe u-in*, "ear ornaments split from the edge (of the shell) by hitting."

Nose-rings.—A few Omaha women wear them. When J. La Flèche was a boy he saw two young men who wore them.

Breast ornaments.—The kind commonly seen is "*ni ki-de*," which is made of shell, and is about four inches in diameter. In the middle are two small holes, through which is passed the thong by which it is hung from the neck.

Knife-sheaths are attached to the belt on the left side, and are worn by men as well as by women. Those of the men are often decorated with bead-work, and are shorter and narrower than those of the women. The only ornamentation on the latter consists of rows of brass nails or tacks, placed on the wide part of the sheath proper, next the knife blade.

A fire-steel holder was composed of two pieces of skin. The pointed end of the longer piece was turned over after the fire-steel was put in, thus forming a cover for the sheath. The short piece was a square, and was sewed on the square part of the longer piece, forming a pocket or sheath.

Pomades for the hair.—In former days, the chief pomade consisted of buffalo fat mixed with fragrant grass. They also said that if one would take the fat of an otter's tail, melt it and mix it with sweet grass, and then rub the mixture on the head, the growth of the hair would be promoted.

Soaps were unknown, but they cleansed the hands by washing them in ashes and water. After eating, the face and hands were usually wiped with a wisp of grass. See p. 316, Om. Soc., in 3d Eth. Rept.

Combs and brushes were unknown; but they had a good substitute for both in the *kha-de mi-ka-he* or grass-comb. This was made of a very stiff grass, gathered in the spring of the year. The grass is soon knocked down, the twigs are collected, and deer-sinew is wrapped around them, forming a bush which is about the size and shape of an ordinary shaving-brush, but much stiffer.

Tweezers or spiral pieces of wire are now used for removing the beard, mustache, and eyebrows of men. Hair used to be removed from the sides of the head by running a hot stone very rapidly along the head. This was done when the hair was worn Osage fashion.

Mirrors.—A clear stream answered for this purpose, hence the name, *ni u-ki-gdha-sin*, "he peeped into the water at himself," now applied to mirrors.

Perfumes.—Five of these are found among the Omaha and Ponka. The first is the *pe-zhi zan-sta* or "strong-smelling grass," which is plaited into necklaces and carried about by men as well as by

women. This grass has a very pleasant odor, resembling that of the vanilla bean. The second kind is the *i-nu-bdhañ-ki-dhe sa-be*, "the black seeds, which emit a pleasant perfume," columbine seeds.(?) These seeds are tied up in pieces of calico, etc., which are worn about the neck. The third is the *pe-zhi pa* or "bitter grass." The fourth consists of the small seeds found in the *ma-zi zhu* or cedar cones. The fifth is known as the *in-tchañ-ga iñ-gdhe e-gan*, "what resembles mouse dung." It is a grass seed smaller than seed wheat, and is found in Iowa, at the head of a stream which the Omaha call *Mi-ka tan* or "Where raccoons abound."

Porcupine-work.—This and fringe (*ga-sne-sne*) were the only kinds of dress ornamentation known in ancient days. The art of putting on porcupine-work was called *u-dhi-ske*, because the quills were put on as closely as possible, making them lie thick together (*u-ske*). The women used to dye some of the quills red, others black, and some yellow, leaving the rest white. These quills were put on moccasins, leggins, robes, shirts, pipe-stems, quivers, knife-sheaths, tobacco-pouches of deer or antelope skin.

Dyes.—Red dye for quills and horse-tails was made thus: Before frost the women gathered together the sumac berries and laid them away to dry. They also gathered the roots of a fine grass, called "*gdhan-de*," which they pounded between two stones, and mixed with the sumac; the latter not being pounded. There were two kinds of black dye. One was made by taking the yellow unburnt clay from which Indian red was made, mixing it with grease, and putting it into a kettle, where it was fried till it became black. Sometimes the former mixture was put into a kettle in which maple bark had been boiled, and this compound was the other black dye. Yellow dye was the product of the *we-zi-dhe dhin*, which are the yellow flowers of a fine grass which is a parasite of the *zha-kdhda zi* (a plant not as tall as the Nebraska sunflower matures in September, not yet identified). Sometimes these yellow flowers were taken when the sap was in the grass and placed in a kettle with the quills to be dyed. The bundle was tied very tightly and laid away for two or three days. The pressure forced out the sap and this moistened and dyed the quills at the end of that period; but when they wished to dye them very quickly the quills and the flowers were boiled together in a kettle of water.

Bead-work was not known among these tribes prior to contact with the white people. It has superseded porcupine-work among most of the tribes along the lower Missouri river.

Skin ornamentation.—Tattooing was practiced in the early days. La Flèche and Two Crows said that no well-behaved man was ever tattooed; but I have seen several aged men, among whom was the chief Two Bears or Yellow Smoke, and Ki-shta-wa-gu, who were thus marked, one on the fingers and the other on the wrists, with transverse lines. Tattooing was chiefly practiced on the daughters of the principal men of the tribe, who could afford to purchase this great privilege. Such women were marked on the foreheads, breasts, backs, and wrists. The mark on a woman's forehead was a round spot, that symbolized the sun, to which the woman was consecrated by the ceremony. Previous to the ceremony some box-elder wood was charred, pounded and moistened. The operator took an instrument consisting of three or four needles tied to the truncated and flattened end of a stick, so arranged that the points formed a straight line. With this he pricked the charcoal into the skin, following the lines of the figures which had been traced thereon. This tattooing was called "*pe batu*," i. e. making the forehead blue by pricking it. At present this ceremony of tattooing the women is performed by the young chief I-shta ba-su-de (son of Yellow Smoke) of the Hañ-ga gens. Only chiefs can witness the act. The Osage have a similar custom, but it forms part of the ceremonies of one degree in their secret order. Instead of one spot on the forehead they make two.

The men often reddened the parting of their wives' hair, as well as their cheeks, after they had combed their hair for them. In one of the myths the girl calls on her brothers and grandfather to comb her hair; and an Iowa legend tells of a similar service performed for several days in succession by a husband for his wife. Men used to paint their faces with Indian red, yellow earth, and burnt earth. Some Omahas rubbed common clay or mud over their faces in oblique stripes. Any pattern was made, just as suited the man's fancy. The face was painted with charcoal in time of war. See p. 317, Om. Soc., in 3d Eth. Rept. Among the Osage, each design had its meaning, referring either to the gens of the man or else to the animal or other mysterious being whose aid he invoked. Black earth was used for painting on the buffalo hides in former days, when the badges of the different gentes were painted on the principal tents. See pp. 230, 234, 240, *et passim*, in Om. Soc., 3d Eth. Rept. When they wished to paint a hide, instead of a brush, they used a piece of pumice stone or a dried buffalo bone. The latter was scraped away till it became very thin.

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*In the last number of the journal this article was erroneously attributed to Gratal y Morles.

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BOOK NOTICES.

A Lenâpé-English Dictionary. From an Anonymous MS. in the Archives of the Moravian Church at Bethlehem, Pa. Edited, with Additions, by Daniel G. Brinton, A. M., M. D., Professor of Archaeology and Linguistics in the University of Pennsylvania, and Rev. Albert Seqaqkind Anthony, Assistant Missionary to the Delawares and Six Nations, Canada. Philadelphia: The Historical Society of Pennsylvania, 1888. (The Pennsylvania Students' Series. Vol. I. Philadelphia: The Historical Society of Pennsylvania, 1889.)

Doctor Brinton has laid students of American linguistics under many and deep obligations, and the volume just issued will materially increase the debt. The "Lenâpé-English Dictionary" is the first of a series of volumes relating to the history of Pennsylvania which are intended to be issued by the Pennsylvania Historical Society. The present book does not purport to be, by any means, a complete dictionary of the Lenâpé language. It represents simply the dialect employed by the Moravian missionaries, about the period of 1840, and is chiefly derived from a manuscript in the Moravian archives at Bethlehem, presumably compiled by Mr. Dencke. In its preparation Doctor Brinton was fortunate in being able to secure the co-operation of the Rev. Albert Seqaqkind Anthony, a native Lenâpé, who is perfectly familiar with his language as spoken on the Six Nation Reservation, in Ontario, Canada. In addition to his valuable verification of the form and meaning of the words, this Indian scholar has made many emendations and additions from the present standpoint of the language and from the dialect of the Minsi sub-tribe, thus adding much to the substance and value of the work. Taken in connection with Zeisberger's Dictionary, the student has a very complete dictionary of the Delaware language, though the latter volume is by no means to be compared to the present work in point of accuracy and scholarship. The original dictionary was written, of course, in the German alphabet, which would impair its usefulness to the English student had not

Doctor Brinton furnished a key to the more important alphabetic differences. The extreme clearness and beauty of the type and the general make-up of the volume might serve as a model for future works of this character. A well-prepared index, which is really in the nature of an alphabetically arranged cross-reference, renders easy the reference from English to Lenâpé, and to a great extent makes unnecessary an English-Lenâpé dictionary.

H. W. HENSHAW.

Among Cannibals, an Account of Four Years' Travels in Australia and of Camp-Life with the Aborigines of Queensland by Carl Lumholdt, M. A., Member of the Royal Society of Sciences of Norway, Translated by Rasmus B. Anderson, Ex-United States Minister to Denmark, with Portrait, Maps, Four Chromo-Lithographs and Wood-Cuts. New York: Charles Scribner's Sons. 1889.

This is an octavo volume of nearly 400 pages, handsomely printed, showily bound, and well illustrated. Much of the text is occupied by the personal adventures of the author, descriptions of scenery and of the life of European colonists in Australia, but there is not more than enough of such matter to afford a general interest to the work and to give the reader a fair idea of the surroundings of the race which forms the main subject of the work—the Cannibals of Australia.

The author seems to have gone to the southeastern continent primarily as a zoologist. Anthropology was a secondary consideration in the beginning, but before he left the country it became uppermost in his thoughts. It was to find a mammal new to science that this explorer undertook his most perilous journey, with only native companions, among the wild mountains of northern Queensland; but on his toilsome marches he gathered information that the anthropologist will value far beyond the hard-won skins of the *boongary*, which he went into the wilderness to seek. He adopted the best and, we might almost say, the only method of acquiring original ethnographic facts; he trusted his life among the treacherous natives, lived with them and shared a common lot with them.

The statements which he offers us as the results of a specific purpose in investigation are of great value, but the little items which he has picked up by the wayside when he had apparently no direct aim

in view are of equal or often of higher importance. The comparative and the speculative ethnologist will find this book a storehouse of suggestive facts.

We know from the works of other explorers that the aborigines of the older Australian colonies possess an elaborate social system, with totemic clans and a complex classification of kinship. Our author has apparently not investigated this question among the races of Queensland, or if he has he tells us nothing directly about it, but we can fairly conjecture that some such system exists in tropical Australia from certain passages, as that relating to name giving on page 230, and that treating of terms of relationship on page 199, and that speaking of tabus on page 136.

The student of American ethnography will, we think, gain a more exalted idea of the cult of the northern Australians from incidents casually related by the author than from his formulated opinions of their religious beliefs. On page 136 we find an allusion to a series of initiations or ordeals which the Australian male has to pass through between youth and old age. They seem somewhat similar in character to those of certain esoteric societies graduated according to age which exist among our American races and which possess most elaborate "work" in the different degrees. The oft quoted *Korroboree* is usually considered by travelers as a mere dance for amusement; our author refers to it as a "festival dance" (p. 236), yet we feel that he gives true key to its purport when he tells us (p. 239), "I could not induce them to explain to me the significance of the performance, but still I managed to find out that it had some connection with the devil." That it is a ritual or religious dance we have no doubt. It is probable that this application of the word devil is derived from the colonists. It is a common practice among christians to regard heathen gods as devils. The Spanish conquerors declared that the American races worshipped the devil, but we now know these races had as good a lot of gods as ever ancient Greek or Roman prayed to. The distinction between a deity and a demon is often but a matter of individual judgment. The gods of the highest race have been vindictive and cruel. On the whole, from the perusal of this book, we are led to the opinion that the natives of Queensland have a cultus well worthy of earnest study.

On page 284 Mr. Lumholtz declares that sacrifices are not to be found in Australia. On page 136 he relates that, after certain cere-

monies performed over a boy, "the strips of skin which gradually fall off from the wounds as they heal are gathered in a little basket, which he subsequently carries for some time about his neck until he finally throws its content out in the woods—gives it to the 'devil,' as it is called. We are inclined to regard this as an instance of a sacrifice, but here there may be between author and reviewer a difference of definition rather than one of opinion.

We derive from Mr. Lumholtz' work a higher estimate of the autochthones of Queensland than we entertained before we read it. We find that they have a sign language; that they use the message sticks observed in other parts of Australia; that they have laws respecting property, binding though unwritten, (p. 147); that they have stated occasions when the injured may right their wrongs, which, if inferior in development to modern courts of justice, are fully equal to the mediæval passages at arms. We discover that wives are often treated with respect and even with fondness, that women have influence, and that their voice is not without its weight in tribal councils.

In describing a *Korrobée*, he says, (p. 239): "On one side of the square, opposite the music, a sort of chamber was constructed where the chief performers made their toilets and kept themselves concealed until the performance commenced." Is not this merely the antipodal counter-part of the medicine-lodge of the American ceremonies? He speaks also of the presence of clowns at the dance; similar characters are commonly seen at Indian rites. The picture of the sepulchral scaffold, on p. 275, might be used to illustrate a book of travel in Dakota 20 years ago. But the parallels between Australian and American ethnography might fill a volume.

The work is readable. No one who peruses the first chapter will lay the book aside until he has finished it. The author satisfies our curiosity on many points, but he arouses it and leaves it still craving on many more. We wish he had witnessed a cannibal feast and could tell us thereof as much from personal observation as he has told us of the snake-feast. We think we could have condoned his offence even had he joined the natives in a hunt for *tálogro*; but we must not expect everything. He has accomplished wonders in four years' travel, occupied as he was with other interests, yet we close the book with the conviction that there is much more to be told. We feel that the lore of the savages of Australia is like the gold of

her mountains, though far more precious, and that much more remains behind than has ever been taken away.

We hope that Mr. Lumholtz' work among the Australians is not ended, and that he may be afforded further opportunities of pursuing his investigations. He is peculiarly fitted for an explorer. He possesses youth, strength, a good digestion, a "strong stomach," a resolute purpose, a Norseman's valor, an enthusiastic love for his work, and, above all, a clear understanding of the peculiar difficulties which beset the path of the ethnographer. Who that has ever wrestled in spirit with the wily savage to win from him the secrets of his heart will not agree with the opinions expressed in the first paragraph on page 228, which he closes by saying: "The best information is secured by paying attention to their own conversations. If you ask them questions they simply try to guess what answers you would like and then they give such responses as they think will please you. This is the reason why so many have been deceived by the savages, and this is the source of all the absurd stories about the Australian blacks."

W. MATTHEWS.

*La France Préhistorique d'après Les Sépultures et les Monuments
par Émile Cartailhac, Paris, 1889.*

The director of the well-known review, *Matériaux pour l'Histoire primitive de l'Homme*, gives the result of many years of labor in this volume of 336 octavo pages with 162 illustrations in the text. While its title restricts its scope to the territory of France and its line of prehistoric researches to sepulchral and monumental remains, those are introduced by a general discussion on the antiquity of man and the primitive stages of his culture. Also throughout the volume comparisons and parallels taken from all parts of the world are presented in illustration and explanation of the topics under immediate examination. The author announces that the present monograph, devoted exclusively to the age of stone, will be followed by one upon the early part of the metallic age.

The most marked characteristic of the work is that it is not confined to a statement of facts more or less definitely ascertained, as is the usual course in treatises intended for simple tuition, but that it

directs at least equal attention to the still uncertain problems upon which the continued efforts of intelligent students may profitably be engaged. The author emphatically professes as his guiding principle that all theories, of whatever apparent value, should retain only a provisional character. He declares that the essential mode of reaching the truth is to make avowal of ignorance, and that the definition of the boundaries of the unknown is the first step in the promotion of discovery. This cautious and philosophic attitude is in marked contrast to the haste and dogmatism which have been shown in some other treatises on prehistoric man. It is illustrated in his judicious, and indeed judicial, discussion of the two so-called Canstadt and Cro-Magnon races, which he concludes by a note of warning on the impossibility of forming valid reasoning from the small number of crania available for study. Granting the races as once distinct, their marches and counter-marches in migrations would necessarily have involved the frequent marriage of the male invaders with the women of the invaded people, and hence hybridization. Intricate mathematical devices for the study of prehistoric man have been unproductive in result. Paleontologists have not found such devices to be necessary in the classification of fossil animals. In every recent year new instruments of precision have been invented for the comparative mensuration of all the bones of man, and cranial measurement has been refined to such an extent as to require eighty groups of figures for its record, yet all with dubious advantage.

Perhaps the most positive, and at the same time the most useful general remarks made by the author on a controverted theme, are on the length of the neolithic age. These remarks suggest the mobility of peoples and their propagation by dispersal as distinct from their migrations in bodies, during the neolithic age. The gradual results of immigration and emigration and of intertribal connection would account for much of what has been attributed, in a loose and grandiose style, to cataclysmic irruptions and convulsions. The causes of change in population which are now in operation were, with proper allowance for differing conditions, in operation in prehistoric times. But, as the author infers, such views require the admission that the neolithic period was of much longer duration than has generally been granted to it in the anthropologic chronology.

This excellent work will be more appreciated by the general student than by specialists, for the reason that specialists are not often philosophic.

GARRICK MALLERY.

Pawnee Hero Stories and Folk-Tales with Notes on the Origin, Customs, and Character of the Pawnee People, by George Bird Grinnell. New York Forest and Stream Publishing Company, 1889.

It has long been known that our Indians possessed a rich store of hero tales and mythology, and that by the narration of these their winter camp-fires were enlivened, the brave deeds done by their warriors were handed down, and the mythical explanation of things were perpetuated from generation to generation. A vast number of these stories have been gathered from time to time by travelers and by students. As repeated by the former the tales are but too often the skeletons of the full narrations, while the literal translations of the professed student, though of great value to the linguist, are by no means so well adapted to the wants of the ordinary reader.

The present volume, therefore, will be welcome to a large class, both because the author's long and intimate acquaintance with the Pawnees enables him to speak whereof he knows, while his literary skill enables him to present his subject in a most attractive style. The author has seized the opportunity to preserve these stories none too soon, for the tribe has wofully diminished of late years. When he knew them on the Loup Fork, in Nebraska, in 1870, they numbered 3,000, while now they number but about 800. The knowledge of the old traditions and of the myths disappear almost as rapidly, and to delay their collection means to lose much of the aboriginal flavor. White influence has already had a marked effect upon many of the customs and beliefs, as appears by the author's statement of Pawnee faith in one supreme deity, a belief which, in the case of no tribe, antedated contact with the European.

The folk-tales selected are of peculiar interest, and some of them doubtless date back to a remote period, though from the nature of their character such stories alter somewhat with each generation. Being in their essential character Indian philosophy—*i. e.*, an attempt to explain the nature and causes of phenomena, they in-

sensibly change with the growth of the people and embody new thoughts as knowledge and experience widen. Thus, though traditional, they are to be regarded as only to a slight extent historical, a truth which applies to hero-tale and myth alike.

The Pawnees are fortunate in having a historian so friendly and patriotic as Mr. Grinnell. No battle-scarred warrior to the manor born could exhibit more enthusiasm for Pawnee prowess in war and generosity in peace, or be more ready to detect and praise Pawnee virtues of all kinds than he. Other writers, with a like personal intimacy with other tribes, have shown the same partiality for them and, it may be added, the same poor opinion of alien and hostile tribes. There is scarcely a tribe prominently known in history which has not thus been exalted at the expense of other tribes—proof that virtues dwell in all alike, ready to spring forth at the touch of friendly intercourse. The Indian makes a capital friend and a dreaded enemy.

The author's "Notes on the Pawnees" occupy 193 of the 417 pages of the volume and contain some extremely interesting and valuable matter. His story of "A Summer Hunt" is a most graphic picture of the old time buffalo hunt, now a memory of the past, and nothing so good in its line has appeared since Parkman gave us his "California and Oregon Trail."

Under the head of "Relationships" the author enumerates the Pawnee divisions and the cognate tribes, but in his ethnologic details he is less happy than in other portions of the volume. It may be stated with confidence that, contrary to the author's conclusions, the Tonkaways and Lipans are not related to the Pawnees nor to each other. The Lipan and Tonkaway have been long associated and are extensively intermarried, and thus doubtless has arisen a confused idea as to their respective languages. The Tonkaway are, in fact, not known to be related to any other tribe, but stand apart and constitute a distinct linguistic family. If the Tonkaway personal names are similar to the Pawnee, the fact is curious and worthy of investigation, though it is by no means unknown for personal names to be borrowed from another tribe. The possession of similar songs may be explained by their purchase, a common Indian practice, or they too may have been borrowed, not perhaps directly from the Pawnee, but from some related tribe. Prior to the Civil War the Tonkaway were placed upon a reservation in Indian Territory,

where they were associated with Wichitas, Towakenoes, Caddos, Kichai, and Waco, all Pawnian tribes, and thus opportunity was afforded for unlimited borrowing.

The relationship of the Lipan to the Pawnee has been affirmed before, as Dunbar noted (p. 219), and for a very curious reason. An old spelling of the name is Lee-panes. The first syllable *Lee-* has been erroneously assumed to be the French particle *Le*, and so translated, The *Panes* or *Pawnees*. In point of fact the Lipan are a branch of the Apaches and speak an Apache dialect, which in turn belongs to the great Athapaskan or Tinné family of languages of British America. If, as the author probably correctly states, the Pawnees and their congeners originally came from the south, the Apache and Lipan, with the same or greater certainty, originated in the far north, and the only bond of kinship between the two peoples is that common to all Indian tribes wherever found.

The value of the book does not depend upon such details as these and should not be judged by them. Altogether the volume may be commended both to the student and the general reader as one of the very best of its class. Scattered through it are cuts of characteristic Pawnee faces, costumes, and implements, which add to its attractive appearance and are in keeping with the generally excellent make-up of the book.

H. W. HENSHAW.

Bibliography of the Muskogean Languages by James Constantine Pilling. Washington: Government Printing Office. 1889. (Bulletin of the U. S. Bureau of Ethnology.)

The interest in American linguistics here and abroad is evidently increasing, and the number of scholars in the country at present engaged in the study of Indian languages, though even now not large, is a constantly growing one; ere long the subject will receive the attention it deserves. It is to be remarked, however, that as the number of students increase opportunities to collect material are diminishing, and with ever increasing rapidity. As the Indians die out, opportunities for original investigation die with them, and thus it appears that the duty of the hour for linguistic students is to accumulate and preserve the vanishing material rather than to elaborately study it. While the labors of Mr. Pilling concern the discovery and record of the linguistic material already gathered, they

have a distinct and important value, since they not only record the titles of books and tell where they may be consulted, but they furnish a comparative view of what has been done and of what remains to do to perfect the material for study in each group of languages. The fourth instalment of Mr. Pilling's work is now at hand in the "Bibliography of the Muskogean Languages." The author's original plan contemplated a large volume, to include the whole subject of Indian bibliography, and in fact proof-sheets of this were printed and distributed among a small number of students. The present method of a separate bibliography for each linguistic stock is a great improvement, for as the studies of each student are generally confined to the languages and dialects of one family, the present plan brings within handy compass just the material needed by each one, and no more. Though based upon the material accumulated under the earlier plan of a single volume, the present Muskogean bibliography is much more full than its predecessor, as it embodies the results of the compiler's later extensive researches, both at home and abroad, in public and private libraries. All the entries are under one alphabetic arrangement, a plan at once so simple and convenient that no one can fail to find what he is in search of or to learn just what material is available for study. To the latter end the plan adopted of cross-reference from the tribes to the matter published in the particular dialect, and to the authors, is an admirable one.

The fifth instalment is to be the Algonquian family—the most fruitful in material of all—and this is already far advanced toward completion. Altogether, linguistic scholars are greatly indebted to Mr. Pilling for the energy and thoroughness with which he has prosecuted his researches and for the admirable way in which they are presented, and to the Bureau of Ethnology under whose auspices the work has been prosecuted.

F. A. SEELY.

The Legends and Myths of Hawaii—The Fables and Folk-Lore of a Strange People. By His Hawaiian Majesty Kalakaua. Edited and with an Introduction by Hon. R. M. Daggett. New York: Charles L. Webster & Co., 1888. 8vo, pp. 530, with map, pll., and ill.

Among the numerous works on folk-lore which have recently appeared, the present book is far from being the least important. Its interest consists in the fact that it contains the legends of one of a series of groups of isolated peoples extending over a vast area, though connected by linguistic and ethnic affinities, and in the additional fact that these mythical and semi-historical tales have been compiled and arranged by the ruler of the people among whom they are preserved. Though Kalakaua is known to be a writer of good English, and is probably fully competent for the production of these tales, no doubt the volume has benefited by the collaboration of Mr. Daggett, who in addition to his editorship supplies a valuable introduction of 65 pages.

In theorizing as to the origin of the Hawaiians, Mr. Daggett discards the current idea that they are of Malayan origin and adopts the view of the late Judge Fornander, who believed the Polynesian and Malayan races to be distinct, and traces the Hawaiian people to an Aryan origin in Asia. Mr. Daggett sees proofs of such an origin in the old Hawaiian religion, which he states has a "theocracy of curious structure," "a system of idolatrous forms and sacrifices engrafted without consistency upon the Jewish story of the creation, the fall of man, the revolt of Lucifer, the Deluge, and the repopulation of the earth."

In answering the question, "How did the Hawaiian priesthood become possessed of the story of the Hebrew genesis?" Mr. Daggett discards the idea that the story was acquired through Israelitish contact with the ancestors of the Polynesians, and offers as more reasonable the assumption that the "Hawaiian theogony, so strangely perpetuated, is an independent and perhaps original version of a series of creation legends common in the remote past to the Cushite, Semite, and Aryan tribes," and he might have added to most other peoples of the earth. If such criteria are to be relied upon as proof of origin and genetic relationship, then truly the whole world is akin. The mythology and customs of the North American Indians offer a great many parallels to Israelitish and other ancient beliefs

as striking as the Polynesian, and writers have not failed to use them to prove the descent of the Indians from Aryan or Semite ancestors.

According to recent anthropologic investigations it would appear that the groups of the Pacific, usually designated as the Polynesians, and the remaining insular peoples, termed the Papuans—one branch of which is represented by the Malagasy of Madagascar—are allied, although the former are distinguished by having wavy hair and light complexion, and the latter woolly hair and a dusky skin.

The Hawaiian Islands were made known to the world through their discovery by Capt. Cook in January, 1778, although it is stated that a manuscript chart, still in existence in the archives of the Spanish Government, goes to prove that these Islands had been discovered as early as 1555, by Juan Gaetano, on his trip from the coast of Mexico to the Spice Islands.

The first appearance of the Hawaiians in their present habitat was, according to tradition, about the middle of the sixth century, and at intervals other bands continued to arrive from the southern islands, presumably the Society group.

In the introduction is presented a list of sovereigns of Hawaii, giving the dates and duration of their reigns, commencing in 1095, and ending with the present ruler. The law of the *tabu* is explained as having been "a prerogative adhering exclusively to political and ecclesiastical rank. It was a command either to do or not to do, and the meaning of it was 'obey or die.'" The *puloulou*, or *tabu* mark, was placed upon or opposite anything not to be trespassed upon or to be entered—as the temples. The *tabu* color of royalty was yellow, while that of the priesthood was red, and feather mantles of these colors could be used only by kings and princes. A royal robe of this character is in the ethnologic collection of the National Museum in this city.

No reference is made either to the former practice of tattooing in Hawaii, or to the pictographic delineation of objects or ideas, although it is well known that petroglyphs occur quite frequently in some of the southern groups of islands, as well as the evidences of a past knowledge of some form of mnemonic characters.

In addition to an interesting account of the ancient religion, arts, habits and customs, illustrations are given of various utensils and weapons. Of the twenty-one legends presented those embraced between the first and the sixteenth, "The Destruction of the

Temples," relate to that period of Hawaiian history from the twelfth to the beginning of the present century. The remaining narratives are more purely mythical and relate chiefly to Hawaiian gods and goddesses.

The appendix consists of a glossary of over 450 words, with a brief note respecting the language, which, properly, contains but twelve characters, five vowels and seven consonants.

The character of the volume is such as to reflect great credit upon its author and to insure its welcome among folk-lore students.

W. J. HOFFMAN.

NOTES AND NEWS.

THE DESCENDANTS OF PALÆOLITHIC MAN IN AMERICA.—In an interesting article in the December number of the *Popular Science Monthly*, Dr. Abbot presents some important conclusions from recent studies from the Trenton district. He is convinced from long experience, that "in the vast majority of instances stone implements are practically in the same position that they were when buried, lost, or discarded."

In certain upland fields, never far from water courses, and in the alluvial mud of the tide-water meadows of the Delaware, he finds "well designed spear points, larger than Indian arrowheads, which might readily be supposed to be the handiwork of the historic Indians." Not more than 20 per cent. of these are found in other situations. With these he correlates a "rude pottery" found by Prof. Lockwood, in upland fields of the same locality. Referring such implements to palæolithic man, he concludes that he or his immediate descendants were not "strictly amphibious" but that they resorted to the forests and uplands for game.

The spear points are of argillite, as are the rude gravel implements which have been referred to the glacial epoch, and he concludes that the former indicate "no change of race, no abrupt transition from one method of tool-making to that of another, but merely an improvement that was doubtless as gradual as the change from the epoch of glacial cold to that of our moderate climate of to-day." He finds a marked preponderance of argillite implements on the crests of the uplands and a very great excess of jasper and

quartz on the bottom land, or that* directly adjacent to the stream, and hence infers that when these higher points were occupied, the present streams maintained a uniform flow as high as the freshest stage of the present water courses. The fact that Indian village sites are nearer the water courses indicates that the "volume of water in all our streams, comparing century with century, is gradually lessening."

In solving the question of the race which made argillite implements, he seems inclined to dissent from the quoted conclusion of Prof. Haynes that, "the palæolithic man of the river gravels at Trenton and his argillite using posterity, the writer believes to be completely extinct," and believes that they who fashioned these rude argillite implements were the descendants of palæolithic man, and his superior in so far as a knowledge of the bow and arrow and rude pottery indicates."

* This intermediate people he refers to the Eskimo. He does not consider that the Eskimo are necessarily the descendants of the more advanced palæolithic people, but that both were derived from palæolithic man.

The conclusion reached by Dr. Abbott, that the palæolithic man of the Trenton gravels did not remain absolutely stationary in respect to his arts, but improved his rude argillite implements to an extent which renders them comparable with Indian productions of a like nature, seems reasonable enough. To conclude also, that palæolithic man, habituated as he was to a cold climate and to the arts engendered thereby, followed the retreating ice-sheet northward, as doubtless did the animals and birds upon which he subsisted, and finally developed into the Eskimo, is not unreasonable.

The probability that some of the palæolithic men who dwelt at the edge of the ice-sheet when it occupied New Jersey, may have remained; and that "their descendants changed in their habits, so as to meet the requirements of a temperate climate," did not escape Dr. Abbott's attention.

Palæolithic man of New Jersey, habituated to a temperate climate—and the gradual recession of the ice-sheet with the consequent slow change of climate, fauna and flora gave ample time for such habitude—seems to possess all the requirements of the North American Indian. In fact, the Eskimo himself seems to be no other being, so far as we have evidence, than the Indian under the peculiar conditions of arctic climate. In some respects he is highly

specialized by the peculiar conditions of his life which merely means, I take it, that in order to live at all in the regions which he chose for his own, or was driven to, he brought himself into harmony with his surroundings, as have all other tribes and peoples wheresoever they live. But his language, arts, institutions, religion, methods of subsistence, and perhaps also his physical traits hardly differ more from many other stocks of Indians than such stocks do from each other.

The explanation of the origin of the many distinct families of Indians—and there are fifty-eight north of Mexico—will explain the origin of the Eskimo stock as well. There seems to be no present proof of a cataclysm which divides palæolithic man in this country from his successor, the North American Indian, and until such proof is forthcoming, it is more rational to consider palæolithic man as he who first left traces of his presence in this country and bequeathed his rude arts in unbroken succession to descendants who lived on and were found by Columbus in full possession of the land.

MOUND EXPLORATION IN GEORGIA.—The results of a recent investigation of a Georgia mound by Mr. Reynolds, of the Bureau of Ethnology, are among the most remarkable yet recorded. This mound was discovered in a bend of the Savannah river, three miles from Hollywood and about the same distance from Silver Bluff, one of the supposed sites of the ancient town of Cutifachiqui. It proved to be a burial mound of the stratified type—the sub-stratum being a hard vegetable or “crawfish” soil, seven feet in depth, and the upper a sandy micaceous loam. The subsoil alone contained the interments.

Human Crania.—Only the merest traces of crania and teeth remained. The conditions were very conducive to decay.

Pottery.—The pottery consists of twenty-three clay pots, ranging in size from small narrow neck jars to huge urns or cooking vessels containing about sixteen gallons. Two of the latter class, elaborately ornamented by means of a stamping and combing process, respectively, are considered the largest specimens of aboriginal pottery yet discovered. One of the smaller specimens, which doubtless bears some religious significance and which from its character has been

denominated "the triune pot," consists of a vase, the neck of which unites three uniform human heads that form its base. Another, which might also have served some mythological function is elaborately and ingeniously carved, the carving being that of two symbolical rattlesnakes, their heads surmounted by horns, and their teeth, fangs, and rattles faithfully and skillfully executed. In one portion where the winding outline of the two serpents affords the space a human face is delineated in a somewhat grotesque manner. The tempering material of the pottery consists of a micaceous sand.

Copper Implements.—These were four celts of hammered, laminated copper, with more or less flaring edges. They were evidently objects more of treasure than of utility, for they had been wrapped in cloth and encased in bark, as was indicated by the remains of these perishable materials preserved by contact with the carbonate of copper.

Copper Ornaments.—These were plates of thin copper, with aboriginal figures worked in relief and similar in type to the repoussé specimens found in the celebrated mound at Etowah. Owing to the thinness of the copper and the great degree of oxidation that had occurred these specimens were found broken and so brittle that it was with difficulty they could be handled. These evidently were also objects highly prized by their owners, since they had been enveloped first in some kind of leather, which in turn was wrapped in a fine rush matting, and the whole encased in bark.

Several copper-sheathed wooden bosses were also found, similar in type to those described by Dr. Joseph Jones from a mound in Tennessee.

Galenite.—Four lumps of crude galenite, each about the size of a hen's egg, were interred with the above specimens of copper.

Textile Fabrics.—The traces of textile fabrics that appear with the copper specimens and preserved by contact with the copper carbonate, are of the primitive aboriginal type. The cloth is of the twined combination described by Mr. Holmes under group No. 2, in his work on Prehistoric Textile Fabrics. The fibre is vegetable, most probably of mulberry bark or cane. The rush matting is of the simple interlacing type, but the texture is of a finer quality than any hitherto found.

Pipes.—There were also found eleven pipes ingeniously carved, some from stone others from clay. All present a distinct type. One represents the head and body of an owl; another, carved from

soapstone, the figure of a sitting man with legs crossed and heels against the buttocks. The bowl of the pipe is in his lap and held between his hands. Hands, features, and head-dress are most skillfully delineated and the whole indicates a marked advance in the sculptor's art.

Stone Implements.—Many stone implements, such as flint spear-heads, celts, chisels, sharpening, and discoidal stones were found. Probably the most perfect and remarkable specimen of its kind is an extremely symmetrical bi-concave disk of marble, having a small uniform pit or depression in the center of each concavity.

Beads.—Perforated beads of pearl and shell were found in close proximity to the remains of human teeth. The shell beads were quite plentiful, and were of three types—some being prototypes of the beads discovered in the great mound at Etowah.

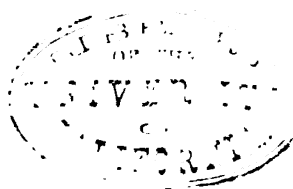
These burials were all deposited upon a thin layer of sand upon two general levels within the lower division of the mound. Upon each level they lay in a circle just beneath hearths or fire-beds which appear to indicate the subsequent performance of some ceremony with fire over the spot where the burials had been made. None of the interments can be considered intrusive since the homogeneity of the lower soil in which they lay was undisturbed.

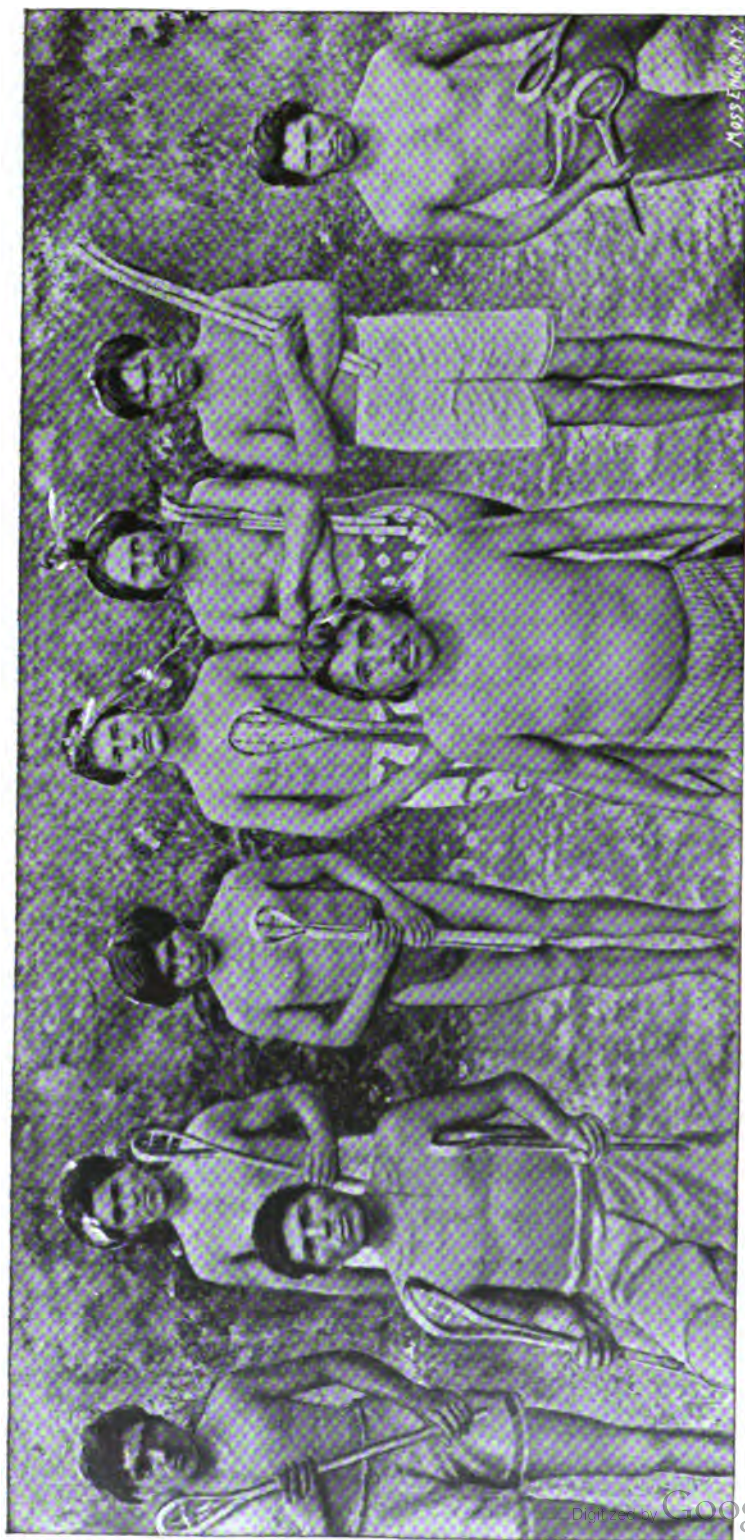
Mr. Reynolds' report describing in full the features and contents of this mound, will be duly published, with illustrations, in one of the Bulletins of the Bureau of Ethnology.

H. W. HENSHAW.

Os INCÆ.—In a series of eighty-two skulls belonging to the Canadian Institute, coming from various parts of the province of Ontario, probably mostly Algonkins, I find that the *Os Inca* is perfectly developed in only one skull; or in 1.22 per cent. (in exact figures, 1.2195). I have not completed a careful examination for the *Os quadratum* and allied varieties.

A. F. CHAMBERLAIN.





WOLFTOWN BALL TEAM, OCTOBER, 1888.





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No. 2.

THE CHEROKEE BALL PLAY.

BY JAMES MOONEY.

The Indian game of the ball play is common to all the tribes from Maine to California, and from the sunlit waters of the Gulf of Mexico to the frozen shores of Hudson bay. When or where the Indian first obtained the game it is not our province to inquire, but we may safely assume that the brown-skinned savage shaped the pliant hickory staff with his knife and flint and twisted the net of bear sinew ages before visions of a western world began to float through the brain of the Italian dreamer.

In its general features, Indian ball play was the same all over the country, with this important exception, that among the northern and western tribes the player used but one ball stick, while in the Gulf States each contestant carried two and caught the ball between them. In California men and women played together, while among most of the more warlike tribes to the eastward it was pre-eminently a manly game, and it was believed to insure defeat to a party if a woman even so much as touched a ball stick.

The game has a history, even though that history be fragmentary, like all that goes to make up the sum of our knowledge of the aboriginal race. The French, whose light-hearted gaiety and ready adaptability so endeared them to the hearts of their wild allies, were quick to take up the Indian ball game as a relief from the dreary monotony of long weeks in the garrison or lonely days in the forest. It became a favorite pastime, and still survives among the creoles of Louisiana under the name of *Raquette*, while in the more invigorating atmosphere of the north it assumed a new life, and, with the cruder features eliminated, became the famous Canadian national game of *La Crosse*. It was by means of a cleverly devised

stratagem of a ball play that the savage warriors of Pontiac were enabled to surprise and capture the English garrison of old Fort Mackinaw in 1763. Two years before the Ojibwa chief had sent the ominous message: "Englishmen, although you have conquered the French, you have not yet conquered us;" but the warning was unheeded. The vengeance of the savage may sleep, but never dies. On the fourth of June, 1763, the birthday of King George of England, the warriors of two great tribes assembled in front of the fort, ostensibly to play a game in honor of the occasion and to decide the tribal championship. The commandant himself came out to encourage his favorites and bet on the result, while the soldiers leaned against the palisades and the squaws sat about in groups, all intently watching every movement of the play. Suddenly there comes a crisis in the game. One athletic young fellow with a powerful stroke sends the ball high in air, and as it descends in a graceful curve it rolls along the ground to the gate of the fort, followed by four hundred yelling savages. But look! As they run each painted warrior snatches from his squaw the hatchet which she had concealed under her blanket, and the next moment it is buried in the brain of the nearest soldier. The English, taken completely by surprise, are cut down without resistance. In a few minutes all is over, and a solitary trader, looking out from the garret where he had been hidden by a friendly squaw, sees the ground covered with the bodies of his slaughtered countrymen, while with yells of savage victory their butchers are drinking the blood scooped up in the hollow of their joined hands.

Let us turn from this dark picture to more recent times. In the late war three hundred of the East Cherokee entered the Confederate service, and in the summer of 1863—just a century after the fatal day of Mackinaw—a detachment of them was left to guard the bridge over the Holston river, at Strawberry Plains, in Tennessee. But an Indian never takes kindly to anything in the nature of garrison duty, and time hung heavy on their hands. At last, in a moment of inspiration, one man proposed that they make some ball sticks and have a game. The suggestion was received with hearty favor, and soon all hands were at work putting up the poles, shaping the hickory sticks, and twisting the bark for the netting. The preliminary ceremonies were dispensed with for once, the players stripped, and the game began, while the rest of the Indians looked on with eager interest. Whether Wolf Town or the Big Cove would have

won that game will never be known, for in the middle of it an advanced detachment of the "Yankees" slipped in, burned the bridge, and were moving forward, when the Cherokee, losing all interest in the game, broke for cover and left the Federals in possession of the ground.

In 1834, before the removal of the Cherokee to the west, a great game was played near the present site of Jasper, Georgia, between the settlements of Hickory Log and Coosawattee, in which there were eighteen players on a side, and the chiefs of the rival settlements wagered \$1,000 apiece on the result.

There is a tradition among the few old traders still living in upper Georgia, to the effect that a large tract in this part of the state was won by the Cherokee from the Creeks in a ball play. There are no Cherokee now living in Georgia to substantiate the story, but I am inclined to put some faith in it from the fact that Coosawattee, although the name of a Cherokee settlement, signifies "the old country of the Creeks." The numerous localities in the Southern States bearing the name of "Ball Flat," "Ball Ground," and "Ball Play" bear witness to the fondness of the Indian for the play. To the red warrior it was indeed a royal game, worthy to be played on the king's day, with the empire of the northwest for the stake.

As speed and suppleness of limb and a considerable degree of muscular strength are prime requisites in the game, the players are always selected from among the most athletic young men, and to be known as an expert player was a distinction hardly less coveted than fame as a warrior. To bring the game to its highest perfection, the best players voluntarily subjected themselves to a regular course of training and conjuring; so that in time they came to be regarded as professionals who might be counted on to take part in every contest, exactly like the professional ball player among the whites. To farther incite them to strain every nerve for victory, two settlements, or sometimes two rival tribes, were always pitted against each other, and guns, blankets, horses—everything the Indian had or valued—were staked upon the result. The prayers and ceremonies of the shamans, the speeches of the old men, and the songs of the dancers were all alike calculated to stimulate to the highest pitch the courage and endurance of the contestants.

It is a matter of surprise that so little has been said of this game by travelers and other observers of Indian life. Powers, in his

great work upon the California tribes, dismisses it in a brief paragraph; the notices in Schoolcraft's six bulky volumes altogether make hardly two pages, while even the artist Catlin, who spent years with the wild tribes, has but little to say of the game itself, although his spirited ball pictures go far to make amends for the deficiency. All these writers, however, appear to have confined their attention almost entirely to the play alone, noticing the ball-play dance only briefly, if at all, and seeming to be completely unaware of the secret ceremonies and incantations—the fasting, bathing, and other mystic rites—which for days and weeks precede the play and attend every step of the game; so that it may be said without exaggeration that a full exposition of the Indian ball play would furnish material for a fair sized volume. During several field seasons spent with the East Cherokee in North Carolina, the author devoted much attention to the study of the mythology and ceremonial of this game, which will now be described as it exists to-day among these Indians. For illustration, the last game witnessed on the reservation, in September, 1889, will be selected.

According to a Cherokee myth, the animals once challenged the birds to a great ball play. The wager was accepted, the preliminaries were arranged, and at last the contestants assembled at the appointed spot—the animals on the ground, while the birds took position in the tree-tops to await the throwing up of the ball. On the side of the animals were the bear, whose ponderous weight bore down all opposition; the deer, who excelled all others in running; and the terrapin, who was invulnerable to the stoutest blows. On the side of the birds were the eagle, the hawk, and the great *Tlániwá*—all noted for their swiftness and power of flight. While the latter were pruning their feathers and watching every motion of their adversaries below they noticed two small creatures, hardly larger than mice, climbing up the tree on which was perched the leader of the birds. Finally they reached the top and humbly asked the captain to be allowed to join in the game. The captain looked at them a moment and, seeing that they were four-footed, asked them why they did not go to the animals where they properly belonged. The little things explained that they had done so, but had been laughed at and rejected on account of their diminutive size. On hearing their story the bird captain was disposed to take pity on them, but there was one serious difficulty in the way—how could they join the birds when they had no wings? The eagle, the

hawk, and the rest now crowded around, and after some discussion it was decided to try and make wings for the little fellows. But how to do it! All at once, by a happy inspiration, one bethought himself of the drum which was to be used in the dance. The head was made of ground-hog leather, and perhaps a corner could be cut off and utilized for wings. No sooner suggested than done. Two pieces of leather taken from the drum-head were cut into shape and attached to the legs of one of the small animals, and thus originated *Tlameha*, the bat. The ball was now tossed up, and the bat was told to catch it, and his expertness in dodging and circling about, keeping the ball constantly in motion and never allowing it to fall to the ground, soon convinced the birds that they had gained a most valuable ally.

They next turned their attention to the other little creature, and now behold a worse difficulty! All their leather had been used in making the wings for the bat, and there was no time to send for more. In this dilemma it was suggested that perhaps wings might be made by stretching out the skin of the animal itself. So two large birds seized him from opposite sides with their strong bills, and by tugging and pulling at his fur for several minutes succeeded in stretching the skin between the fore and hind feet until at last the thing was done and there was *Tewa*, the flying squirrel. Then the bird captain, to try him, threw up the ball, when the flying squirrel, with a graceful bound, sprang off the limb and, catching it in his teeth, carried it through the air to another tree-top a hundred feet away.

When all was ready the game began, but at the very outset the flying squirrel caught the ball and carried it up a tree, then threw it to the birds, who kept it in the air for some time, when it dropped; but just before it reached the ground the bat seized it, and by his dodging and doubling kept it out of the way of even the swiftest of the animals until he finally threw it in at the goal, and thus won the victory for the birds. Because of their assistance on this occasion, the ball player invokes the aid of the bat and the flying squirrel and ties a small piece of the bat's wing to his ball stick or fastens it to the frame on which the sticks are hung during the dance.

The game, which of course has different names among the various tribes, is called *anetsä* by the Cherokee. The ball season begins about the middle of summer and lasts until the weather

is too cold to permit exposure of the naked body, for the players are always stripped for the game. The favorite time is in the fall, after the corn has ripened, for then the Indian has abundant leisure, and at this season a game takes place somewhere on the reservation at least every other week, while several parties are always in training. The training consists chiefly of regular athletic practice, the players of one side coming together with their ball sticks at some convenient spot of level bottom land, where they strip to the waist, divide into parties, and run, tumble, and toss the ball until the sun goes down. The Indian boys take to this sport as naturally as our youngsters take to playing soldier, and frequently in my evening walks I have come upon a group of little fellows from eight to twelve years old, all stripped like professionals, running, yelling, and tumbling over each other in their scramble for the ball, while their ball sticks clattered together at a great rate—altogether as noisy and happy a crowd of children as can be found anywhere in the world.

In addition to the athletic training, which begins two or three weeks before the regular game, each player is put under a strict *gaktũnta*, or tabu, during the same period. He must not eat the flesh of a rabbit (of which the Indians generally are very fond) because the rabbit is a timid animal, easily alarmed and liable to lose its wits when pursued by the hunter. Hence the ball player must abstain from it, lest he too should become disconcerted and lose courage in the game. He must also avoid the meat of the frog (another item on the Indian bill of fare) because the frog's bones are brittle and easily broken, and a player who should partake of the animal would expect to be crippled in the first inning. For a similar reason he abstains from eating the young of any bird or animal, and from touching an infant. He must not eat the fish called the hog-sucker, because it is sluggish in its movements. He must not eat the herb called *atũnka* or Lamb's Quarter (*Chenopodium album*), which the Indians use for greens, because its stalk is easily broken. Hot food and salt are also forbidden, as in the medical *gaktũnta*. The tabu always lasts for seven days preceding the game, but in most cases is enforced for twenty-eight days—*i. e.*, 4×7 —four and seven being sacred numbers. Above all, he must not touch a woman, and the player who should violate this regulation would expose himself to the summary vengeance of his fellows. This last tabu continues also for seven days after the game. As before stated, if a

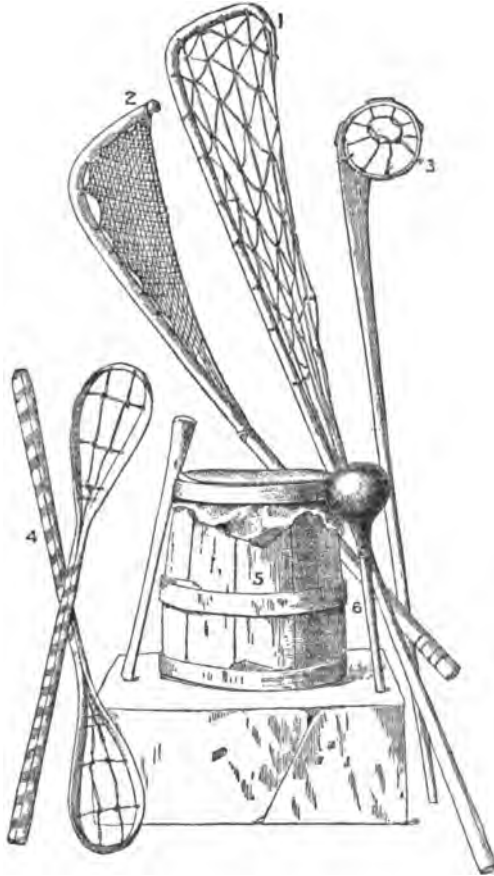


woman even so much as touches a ball stick on the eve of a game it is thereby rendered unfit for use. As the white man's law is now paramount, extreme measures are seldom resorted to, but in former days the punishment for an infraction of this regulation was severe, and in some tribes the penalty was death. Should a player's wife be with child, he is not allowed to take part in the game under any circumstances, as he is then believed to be heavy and sluggish in his movements, having lost just so much of his strength as has gone to the child. At frequent intervals during the training period the shaman takes the players to water and performs his mystic rites, as will be explained further on. They are also "scratched" on their naked bodies, as at the final game, but now the scratching is done in a haphazard fashion with a piece of bamboo brier having stout thorns which leave broad gashes on the backs of the victims.

When a player fears a particular contestant on the other side, as is frequently the case, his own shaman performs a special incantation, intended to compass the defeat and even the disabling or death of his rival. As the contending sides always belong to different settlements, each party makes all these preliminary arrangements without the knowledge of the other, and under the guidance of its own shamans, several of whom are employed on a side in every hotly contested game. Thus the ball play becomes as well a contest between rival shamans. Among primitive peoples the shaman is in truth all-powerful, and even so simple a matter as the ball game is not left to the free enjoyment of the people, but is so interwoven with priestly rites and influence that the shaman becomes the most important actor in the play.

Before introducing the ball dance it is in place here to describe the principal implements of the game, the ball and ball stick. The ball now used is an ordinary leather-covered ball, but in former days it was made of deer hair and covered with deer skin. In California the ball is of wood. The ball sticks vary considerably among different tribes. As before stated, the Cherokee player uses a pair, catching the ball between them and throwing it in the same way. The stick is something less than three feet in length and in its general appearance closely resembles a tennis racket, or a long wooden spoon, the bowl of which is a loose network of thongs of twisted squirrel skin or strings of Indian hemp. The frame is made of a slender hickory stick, bent upon itself and so trimmed and fashioned that the handle seems to be one solid round piece, when in fact it

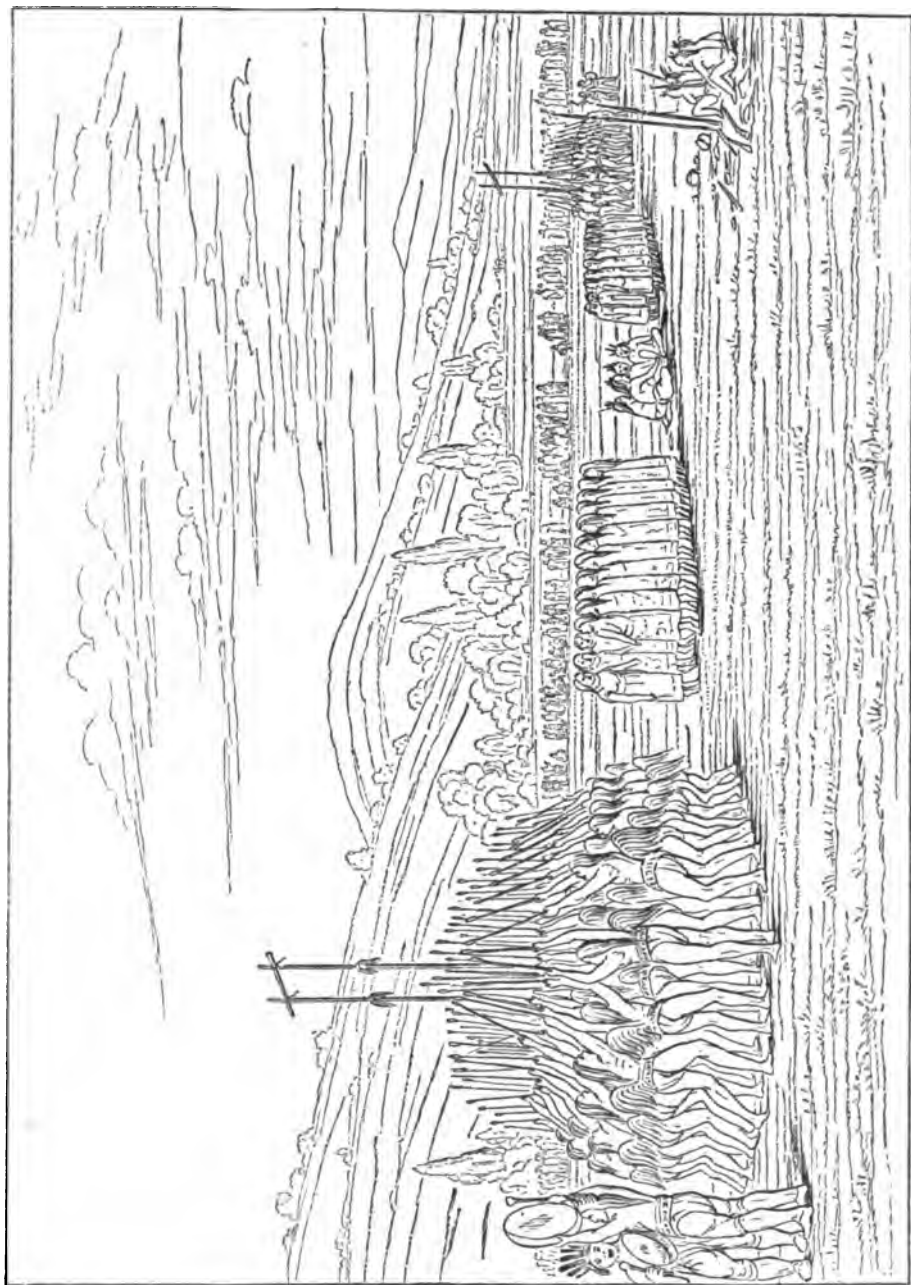
is double. The other southern tribes generally used sticks of the same pattern. Among the Sioux and Ojibwa of the north the player uses a single stick bent around at the end so as to form a hoop, in which a loose netting is fixed. The ball is caught up in this hoop and held there in running by waving the stick from side to side in



INSTRUMENTS OF THE GAME.

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| 1 Iroquois. | 3 Ojibwa. | 5 Drum. |
| 2 Passamaquoddy. | 4 Cherokee. | 6 Rattle. |

a peculiarly dextrous manner. In the St. Lawrence region and Canada, the home of *La Crosse*, the stick is about four and a half feet long, and is bent over at the end like a shepherd's crook, with



the netting extending half way down its length. The Passamaquoddy Indians of Maine use a stick with a strong, closely woven netting, which enables the stick to be used for batting. The sticks are ornamented with designs cut or burnt into the wood, and are sometimes further adorned with paint and feathers.

On the night preceding the game each party holds the ball-play dance in its own settlement. On the reservation the dance is always held on Friday night, so that the game may take place on Saturday afternoon, in order to give the players and spectators an opportunity to sleep off the effects on Sunday. It may be remarked here in parenthesis that the Cherokee word for Sunday signifies "when everybody does nothing all day long," showing that they fully appreciate its superior advantages as a day of rest. The dance must be held close to the river, to enable the players to "go to water" during the night, but the exact spot selected is always a matter of uncertainty, up to the last moment, excepting with a chosen few. If this were not the case a spy from the other settlement might endeavor to insure the defeat of the party by strewing along their trail a soup made of the hamstrings of rabbits, which would have the effect of rendering the players timorous and easily confused.

The dance begins soon after dark on the night preceding the game and lasts until daybreak, and from the time they eat supper before the dance until after the game, on the following afternoon, no food passes the lips of the players. On the occasion in question the young men of Yellow Hill were to contend against those of Raven Town, about ten miles further up the river, and as the latter place was a large settlement, noted for its adherence to the old traditions, a spirited game was expected. My headquarters were at Yellow Hill, and as the principal shaman of that party was my chief informant and lived in the same house with me, he kept me well posted in regard to all the preparations. Through his influence I was enabled to get a number of good photographic views pertaining to the game, as well as to observe all the shamanistic ceremonies, which he himself explained, together with the secret prayers recited during their performance. On a former occasion I attempted to take views of the game, but was prevented by the shamans, on the ground that such a proceeding would destroy the efficacy of their incantations.

Each party holds a dance in its own settlement, the game itself taking place about midway between. The Yellow Hill men were to have their dance up the river, about half a mile from my house.

We started about 9 o'clock in the evening—for there was no need to hurry—and before long began to meet groups of dark figures by twos and threes going in the same direction or sitting by the roadside awaiting some lagging companions. It was too dark to distinguish faces, but familiar voices revealed the identity of the speakers, and among them were a number who had come from distances of six or eight miles. As we drew nearer, the measured beat of the Indian drum fell upon the ear, and soon we saw the figures of the dancers outlined against the firelight, while the soft voices of the women as they sang the chorus of the ball songs mingled their plaintive cadences with the shouts of the men.

The spot selected for the dance was a narrow strip of gravelly bottom, where the mountain came close down to the water's edge. The tract was only a few acres in extent and was covered with large trees, their tops bound together by a network of wild grape-vines which hung down on all sides in graceful festoons. From the road the ground sloped abruptly down to this bottom, while almost overhead the mountain was dimly outlined through the night fog, and close at hand one of the rapids, so frequent in these mountain streams, disturbed the stillness of the night with its never-ceasing roar.

Several fires were burning and in the fitful blaze the trees sent out long shadows to melt into the surrounding darkness, while just within the circle of light, leaning against the trees or stretched out upon the ground, were the Indians, the women with their motionless figures muffled up in white sheets seeming like ghosts returned to earth, and the babies, whose mothers were in the dance, laid away under the bushes to sleep, with only a shawl between them and the cold ground. Around the larger fire were the dancers, the men stripped as for the game, with their ball-sticks in their hands and the firelight playing upon their naked bodies. It was a weird, wild picture, not easily effaced from the memory.

The ball-play dance is participated in by both sexes, but differs considerably from any other of the dances of the tribe, being a dual affair throughout. The dancers are the players of the morrow, with seven women, representing the seven Cherokee clans. The men dance in a circle around the fire, chanting responses to the sound of a rattle carried by another performer, who circles around on the outside, while the women stand in line a few feet away and dance to and fro, now advancing a few steps toward the men, then wheeling and dancing away from them, but all the while

keeping time to the sound of the drum and chanting the refrain to the ball songs sung by the drummer, who is seated on the ground on the side farthest from the fire. The rattle is a gourd fitted with a handle and filled with small pebbles, while the drum resembles a small keg with a head of ground-hog leather. The drum is partly filled with water, the head being also moistened to improve the tone, and is beaten with a single stick. Men and women dance separately throughout, the music, the evolutions, and the songs being entirely distinct, but all combining to produce an harmonious whole. The women are relieved at intervals by others who take their places, but the men dance in the same narrow circle the whole night long, excepting during the frequent halts for the purpose of going to water.

At one side of the fire are set up two forked poles, supporting a third laid horizontally, upon which the ball sticks are crossed in pairs until the dance begins. As already mentioned, small pieces from the wing of the bat are sometimes tied to these poles, and also to the rattle used in the dance, to insure success in the contest. The skins of several bats and swift-darting insectivorous birds were formerly wrapped up in a piece of deerskin, together with the cloth and beads used in the conjuring ceremonies later on, and hung from the frame during the dance. On finally dressing for the game at the ball ground the players took the feathers from these skins to fasten in their hair or upon their ball sticks to insure swiftness and accuracy in their movements. Sometimes also hairs from the whiskers of the bat are twisted into the netting of the ball sticks. The players are all stripped and painted, with feathers in their hair, just as they appear in the game. When all is ready an attendant takes down the ball sticks from the frame, throwing them over his arm in the same fashion, and, walking around the circle, gives to each man his own. Then the rattler, taking his instrument in his hand, begins to trot around on the outside of the circle, uttering a sharp *Hi!* to which the players respond with a quick *Hi-hi!* while slowly moving around the circle with their ball sticks held tightly in front of their breasts. Then, with a quicker movement, the song changes to *Ehu!* and the response to *Hähi!*—*Ehu!* *Hähi!* *Ehu!* *Hähi!* Then, with a prolonged shake of the rattle, it changes again to *Ahiy!* the dancers responding with the same word *Ahiy!* but in a higher key; the movements become more lively and the chorus louder, till at a given signal with the rattle the players clap their

ball sticks together, and facing around, go through the motions of picking up and tossing an imaginary ball. Finally with a grand rush they dance up close to the women, and the first part of the performance ends with a loud prolonged *Hu-ü*! from the whole crowd.

In the meantime the women have taken position in a line a few feet away, with their backs turned to the men, while in front of them the drummer is seated on the ground, but with his back turned toward them and the rest of the dancers. After a few preliminary taps on the drum he begins a slow, measured beat and strikes up one of the dance refrains, which the women take up in chorus. This is repeated a number of times until all are in harmony with the tune, when he begins to improvise, choosing words which will harmonize with the measure of the chorus and at the same time be appropriate to the subject of the dance. As this requires a ready wit in addition to ability as a singer, the selection of a drummer is a matter of considerable importance, and that functionary is held in corresponding estimation. He sings of the game on the morrow, of the fine things to be won by the men of his party, of the joy with which they will be received by their friends on their return from the field, and of the disappointment and defeat of their rivals. Throughout it all the women keep up the same minor refrain, like an instrumental accompaniment to vocal music. As Cherokee songs are always in the minor key, they have a plaintive effect, even when the sentiment is cheerful or even boisterous, and are calculated to excite the mirth of one who understands the language. This impression is heightened by the appearance of the dancers themselves, for the women shuffle solemnly back and forth all night long without ever a smile upon their faces, while the occasional laughter of the men seems half subdued, with none of the hearty ringing tones of the white man or the negro. The monotonous repetition, too, is something intolerable to any one but an Indian, the same words, to the same tune, being sometimes sung over and over again for a half hour or more. Although the singer improvises as he proceeds, many of the expressions have now become stereotyped and are used at almost every ball-play dance. The song here given is a good type of the class.

Through the kind assistance of Prof. John P. Sousa, director of the Marine band, I am enabled to give also the musical notation.

The words have no fixed order of arrangement and the song may be repeated indefinitely. *Higanuyahi* is the refrain sung by the

women and has no meaning. The vowels have the Latin sound and *û* is the French nasal *un* :

FIRST SONG.



Hi'ganu'ya,	hi'ganu'yahi'
Hi'ganu'ya	hi'ganu'yahi'
Sá'kwili-te'ga	tsí'túkata'sûni' !
As'taliti'ski	tsí'túkata'sûni' !
As'taliti'ski	tša'kwakiló'testi !
U'watu'hi	tsí'túkata'sûni' !
Ti'kanane'hi	a'kwakiló'tati' !
Uwa'tutsó'hi	tsí'túkata'sûni' !
Uwa'tutsó'hi	tša'kwakiló'testi' !
I'geski'yu	tša'kwakiló'testi' !
Ti'kanane'hi	tsí'túkata'sûni' !—Hu-û !

Which may be freely rendered :

What a fine horse I shall win !
 I shall win a pacer !
 I shall be riding a pacer !
 I'm going to win a pretty one !
 A stallion for me to ride !
 What a pretty one I shall win !
 What a pretty one I shall ride !
 How proud I'll feel when riding him !
 I'm going to win a stallion !—Hu-û !

But *sic transit gloria*!—in these degenerate days the pacer is more likely to be represented by a cheap jack-knife. Another very pretty refrain is:

SECOND SONG.



Yo'wida'nuwe' Yo'widanu'-da'nuwe'.

At a certain stage of the dance a man, specially selected for the purpose, leaves the group of spectators around the fire and retires a short distance into the darkness in the direction of the rival settlement. Then, standing with his face still turned in the same direction, he raises his hand to his mouth and utters four yells, the last prolonged into a peculiar quaver. He is answered by the players with a chorus of yells—or rather yelps, for the Indian yell resembles nothing else so much as the bark of a puppy. Then he comes running back until he passes the circle of dancers, when he halts and shouts out a single word, which may be translated, “They are already beaten!” Another chorus of yells greets this announcement. This man is called the *Talala*, or “woodpecker,” on account of his peculiar yell, which is considered to resemble the sound made by a woodpecker tapping on a dead tree trunk. According to the orthodox Cherokee belief, this yell is heard by the rival players in the other settlement—who, it will be remembered, are having a ball dance of their own at the same time—and so terrifies them that they lose all heart for the game. The fact that both sides alike have a *Talala* in no way interferes with the theory.

At frequent intervals during the night all the players, accompanied by the shaman and his assistant, leave the dance and go down to a retired spot at the river's bank, where they perform the mystic rite known as “going to water,” hereafter to be described. While the players are performing this ceremony the women, with the drummer, continue the dance and chorus. The dance is kept up without intermission, and almost without change, until day-break. At the final dance green pine tops are thrown upon the fire, so as to produce a thick smoke, which envelops the dancers. Some

mystic properties are ascribed to this pine smoke, but what they are I have not yet learned, although the ceremony seems to be intended as an exorcism, the same thing being done at other dances when there has recently been a death in the settlement.

At sunrise the players, dressed now in their ordinary clothes, but carrying their ball sticks in their hands, start for the ball ground, accompanied by the shamans and their assistants. The place selected for the game, being always about midway between the two rival settlements, was in this case several miles above the dance ground and on the opposite side of the river. On the march each party makes four several halts, when each player again "goes to water" separately with the shaman. This occupies considerable time, so that it is usually after noon before the two parties meet on the ball ground. While the shaman is busy with his mysteries in the laurel bushes down by the water's edge, the other players, sitting by the side of the trail, spend the time twisting extra strings for their ball sticks, adjusting their feather ornaments and discussing the coming game. In former times the player during these halts was not allowed to sit upon a log, a stone, or anything but the ground itself; neither was it permissible to lean against anything excepting the back of another player, on penalty of defeat in the game, with the additional risk of being bitten by a rattlesnake. This rule is now disregarded, and it is doubtful if any but the older men are aware that it ever existed.

On coming up from the water after the fourth halt the principal shaman assembles the players around him and delivers an animated harangue, exhorting them to do their utmost in the coming contest, telling them that they will undoubtedly be victorious as the omens are all favorable, picturing to their delighted vision the stakes to be won and the ovation awaiting them from their friends after the game, and finally assuring them in the mystic terms of the formulas that their adversaries will be driven through the four gaps into the gloomy shadows of the Darkening Land, where they will perish forever from remembrance. The address, delivered in rapid, jerky tones like the speech of an auctioneer, has a very inspiring effect upon the hearers and is frequently interrupted by a burst of exultant yells from the players. At the end, with another chorus of yells, they again take up the march.

On arriving in sight of the ball ground the *Talala* again comes to the front and announces their approach with four loud yells,

ending with a long quaver, as on the previous night at the dance. The players respond with another yell, and then turn off to a convenient sheltered place by the river to make the final preparations.

The shaman then marks off a small space upon the ground to represent the ball field, and, taking in his hand a small bundle of sharpened stakes about a foot in length, addresses each man in turn, telling him the position which he is to occupy in the field at the tossing up of the ball after the first inning, and driving down a stake to represent each player until he has a diagram of the whole field spread out upon the ground.

The players then strip for the ordeal of scratching. This painful operation is performed by an assistant, in this case by an old man named Standing Water. The instrument of torture is called a *kanuga* and resembles a short comb with seven teeth, seven being also a sacred number with the Cherokees. The teeth are made of sharpened splinters from the leg bone of a turkey and are fixed in a frame made from the shaft of a turkey quill, in such a manner that by a slight pressure of the thumb they can be pushed out to the length of a small tack. Why the bone and feather of the turkey should be selected I have not yet learned, but there is undoubtedly an Indian reason for the choice.

The players having stripped, the operator begins by seizing the arm of a player with one hand while holding the *kanuga* in the other, and plunges the teeth into the flesh at the shoulder, bringing the instrument down with a steady pressure to the elbow, leaving seven white lines which become red a moment later, as the blood starts to the surface. He now plunges the *kanuga* in again at another place near the shoulder, and again brings it down to the elbow. Again and again the operation is repeated until the victim's arm is scratched in twenty-eight lines above the elbow. It will be noticed that twenty-eight is a combination of four and seven, the two sacred numbers of the Cherokees. The operator then makes the same number of scratches in the same manner on the arm below the elbow. Next the other arm is treated in the same way; then each leg, both above and below the knee, and finally an **X** is scratched across the breast of the sufferer, the upper ends are joined by another stroke from shoulder to shoulder, and a similar pattern is scratched upon his back. By this time the blood is trickling in little streams from nearly three hundred gashes. None of the scratches are deep, but they are unquestionably very painful, as all

agree who have undergone the operation. Nevertheless the young men endure the ordeal willingly and almost cheerfully, regarding it as a necessary part of the ritual to secure success in the game. In order to secure a picture of one young fellow under the operation I stood with my camera so near that I could distinctly hear the teeth tear through the flesh at every scratch with a rasping sound that sent a shudder through me, yet he never flinched, although several times he shivered with cold, as the chill autumn wind blew upon his naked body. This scratching is common in Cherokee medical practice, and is variously performed with a brier, a rattlesnake's tooth, a flint, or even a piece of broken glass. It was noted by Adair as early as 1775. To cause the blood to flow more freely the young men sometimes scrape it off with chips as it oozes out. The shaman then gives to each player a small piece of root, to which he has imparted magic properties by the recital of certain secret formulas. Various roots are used, according to the whim of the shaman, their virtue depending entirely upon the ceremony of consecration. The men chew these roots and spit out the juice over their limbs and bodies, rubbing it well into the scratches, then going down to the water plunge in and wash off the blood, after which they come out and dress themselves for the game.

The modern Cherokee ball costume consists simply of a pair of short trunks ornamented with various patterns in red or blue cloth, and a feather charm worn upon the head. Formerly the breechcloth alone was worn, as is still the case in some instances, and the strings with which it was tied were purposely made weak, so that if seized by an opponent in the scuffle the strings would break, leaving the owner to escape with the loss of his sole article of raiment. This calls to mind a similar custom among the ancient Greek athletes, the recollection of which has been preserved in the etymology of the word *gymnast*. The ornament worn in the hair is made up of an eagle's feathers, to give keenness of sight; a deer tail, to give swiftness; and a snake's rattle, to render the wearer terrible to his adversaries. If an eagle's feathers cannot be procured, those of a hawk or any other swift bird of prey are used. In running, the snake rattle is made to furnish a very good imitation of the sound made by the rattlesnake when about to strike. The player also marks his body in various patterns with paint or charcoal. The charcoal is taken from the dance fire, and whenever possible is procured by burning the wood of a tree which has been struck by



CHOCTAW BALL PLAYER IN 1832—FROM CATLIN.

lightning, such wood being regarded as peculiarly sacred and endowed with mysterious properties. According to one formula, the player makes a cross over his heart and a spot upon each shoulder, using pulverized charcoal procured from the shaman and made by burning together the wood of a honey-locust tree and of a tree which has been struck by lightning, *but not killed*. The charcoal is pulverized and put, together with a red and a black bead, into an empty cocoon from which one end has been cut off. This paint preparation makes the player swift like the lightning and invulnerable as the tree that defies the thunderbolt, and renders his flesh as hard and firm to the touch as the wood of the honey-locust. Among the Choctaws, according to Catlin, a tail of horse hair was also worn, so as to stream out behind as the player ran. Just before dressing, the players rub their bodies with grease or the chewed bark of the slippery elm or the sassafras, until their skin is slippery as that of the proverbial eel.

A number of precautionary measures are also frequently resorted to by the more prudent players while training in order to make assurance doubly sure. They bathe their limbs with a decoction of the *Tephrosia Virginiana* or Catgut in order to render their muscles tough like the roots of that plant. They bathe themselves with a decoction of the small rush (*Juncus tenuis*) which grows by the roadside, because its stalks are always erect and will not lie flat upon the ground, however much they may be stamped and trodden upon. In the same way they bathe with a decoction of the wild crabapple or the ironwood, because the trunks of these trees, even when thrown down, are supported and kept up from the ground by their spreading tops. To make themselves more supple they whip themselves with the tough stalks of the *Wä'takû* or Stargrass or with switches made from the bark of a hickory sapling which has grown up from under a log that has fallen across it, the bark being taken from the bend thus produced in the sapling. After the first scratching the player renders himself an object of terror to his opponents by eating a portion of a rattlesnake which has been killed and cooked by the shaman. He rubs himself with an eel skin to make himself slippery like the eel, and rubs each limb down once with the fore and hind leg of a turtle because the legs of that animal are remarkably stout. He applies to the shaman to conjure a dangerous opponent, so that he may be unable to see the ball in its flight, or may dislocate a wrist or break a leg. Sometimes the shaman draws upon the ground

an armless figure of his rival, with a hole where his heart should be. Into this hole he drops two black beads, covers them with earth and stamps upon them, and thus the dreaded rival is doomed, unless (and this is always the saving clause) his own shaman has taken precautions against such a result, or the one in whose behalf the charm is made has rendered the incantation unavailing by a violation of some one of the interminable rules of the *gaktunta*.

The players having dressed are now ready to "go to water" for the last time, for which purpose the shaman selects a bend of the river where he can look toward the east while facing up-stream. This ceremony of going to water is the most sacred and impressive in the whole Cherokee ritual, and must always be performed fasting, and in most cases also is preceded by an all-night vigil. It is used in connection with prayers to obtain a long life, to destroy an enemy, to win the love of a woman, to secure success in the hunt and the ball play, and for recovery from a dangerous illness, but is performed only as a final resort or when the occasion is one of special importance. The general ceremonial and the principal formulas are nearly the same in all cases. I have collected a number of the formulas used on these various occasions, but it is impossible within the limits of this paper to give more than a general idea of their nature.

The men stand side by side looking down upon the water, with their ball sticks clasped upon their breasts, while the shaman stands just behind them, and an assistant kneeling at his side spreads out upon the ground the cloth upon which are placed the sacred beads. These beads are of two colors, red and black, each kind resting upon a cloth of the same color, and corresponding in number to the number of players. The red beads represent the players for whom the shaman performs the ceremony, while the black beads stand for their opponents, red being symbolic of power and triumph, while black is emblematic of death and misfortune. All being ready, the assistant hands to the shaman a red bead, which he takes between the thumb and finger of his right hand; and then a black bead, which he takes in the same manner in his left hand. Then, holding his hands outstretched, with his eyes intently fixed upon the beads, the shaman prays on behalf of his client to *Yūwī Gūnāhi'ta*, the "Long Man," the sacred name for the river:

"O Long Man, I come to the edge of your body. You are mighty and most powerful. You bear up great logs and toss them

about where the foam is white. Nothing can resist you. Grant me such strength in the contest that my enemy may be of no weight in my hands—that I may be able to toss him into the air or dash him to the earth.” In a similar strain he prays to the Red Bat in the Sun Land to make him expert in dodging; to the Red Deer to make him fleet of foot; to the great Red Hawk to render him keen of sight, and to the Red Rattlesnake to render him terrible to all who oppose him.

Then in the same low tone and broken accents in which all the formulas are recited the shaman declares that his client (mentioning his name and clan) has now ascended to the first heaven. As he continues praying he declares that he has now reached the second heaven (and here he slightly raises his hands); soon he ascends to the third heaven, and the hands of the shaman are raised still higher; then in the same way he ascends to the fourth, the fifth, and the sixth heaven, and finally, as he raises his trembling hands aloft, he declares that the spirit of the man has now risen to the seventh heaven, where his feet are resting upon the Red Seats, from which they shall never be displaced.

Turning now to his client the shaman, in a low voice, asks him the name of his most dreaded rival on the opposite side. The reply is given in a whisper, and the shaman, holding his hands outstretched as before, calls down the most withering curses upon the head of the doomed victim, mentioning him likewise by name and clan. He prays to the Black Fog to cover him so that he may be unable to see his way; to the Black Rattlesnake to envelop him in its slimy folds; and at last to the Black Spider to let down his black thread from above, wrap it about the soul of the victim and drag it from his body along the black trail to the Darkening Land in the west, there to bury it in the black coffin under the black clay, never to reappear. At the final imprecation he stoops and, making a hole in the soft earth with his finger (symbolic of stabbing the doomed man to the heart), drops the black bead into it and covers it from sight with a vicious stamp of his foot; then with a simultaneous movement each man dips his ball sticks into the water, and bringing them up, touches them to his lips; then stooping again he dips up the water in his hand and laves his head and breast.

Below is given a translation of one of these formulas, from the collection of original Cherokee manuscripts obtained by the writer. The formulistic name for the player signifies “admirer

or lover of the ball play." The shaman directs his attention alternately to his clients and their opponents, looking by turns at the red or the black bead as he prays. He raises his friends to the seventh heaven and invokes in their behalf the aid of the bat and a number of birds, which, according to the Cherokee belief, are so keen of sight and so swift upon the wing as never to fail to seize their intended prey. The opposing players, on the other hand, are put under the earth and rendered like the terrapin, the turtle, the mole, and the bear—all slow and clumsy of movement. Blue is the color symbolic of defeat, red is typical of success, and white signifies joy and happiness. The exultant whoop or shout of the players is believed to bear them on to victory, as trees are carried along by the resistless force of a torrent :

"THIS IS TO TAKE THEM TO WATER FOR THE BALL PLAY."

"Sgě! Now, where the white thread has been let down, quickly we are about to inquire into the fate of the lovers of the ball play.

They are of *such a* descent. They are called *so and so*. (As they march) they are shaking the road which shall never be joyful. The miserable terrapin has fastened himself upon them as they go about. They are doomed to failure. They have become entirely blue.

But now my lovers of the ball play have their roads lying down in this direction. The Red Bat has come and become one with them. There, in the first heaven, are the pleasing stakes. There, in the second heaven, are the pleasing stakes. The Peewee has come and joined them. Their ball sticks shall be borne along by the immortal whoop, never to fail them in the contest.

But as for the lovers of the ball play on the other side, the common turtle has fastened himself to them as they go about. There, under the earth, they are doomed to failure.

There, in the third heaven, are the pleasing stakes. The Red Tla'niwá has come and made himself one of them, never to be defeated. There, in the fourth heaven, are the pleasing stakes. The Crested Flycatcher has come and joined them, that they may never be defeated. There, in the fifth heaven, are the pleasing stakes. The Martin has come and joined them, that they may never be defeated.

The other lovers of the ball play—the Blue Mole has become one with them, that they may never feel triumphant. They are doomed to failure.

There, in the sixth heaven, the Chimney Swift has become one with them, that they may never be defeated. There are the pleasing stakes. There, in the seventh heaven, the Dragonfly has become one of them, that they may never be defeated. There are the pleasing stakes.

As for the other lovers of the ball play, the Bear has come and fastened himself to them, that they may never be triumphant. He has caused the stakes to slip out of their hands and their share has dwindled to nothing. Their fate is forecast.

Sgě! Now let me know that the twelve (runs) are mine, O White Dragonfly. Let me know that their share is mine—that the stakes are mine. Now he [the rival player] is compelled to let go his hold upon the stakes. They [the shaman's clients] are become exultant and gratified. Yû!"

This ceremony ended, the players form in line, headed by the shaman, and march in single file to the ball ground, where they find awaiting them a crowd of spectators—men, women and children—sometimes to the number of several hundred, for the Indians always turn out to the ball play, no matter how great the distance, from old Big Witch, stooping under the weight of nearly a hundred years, down to babies slung at their mothers' backs. The ball ground is a level field by the river side, surrounded by the high timber-covered mountains. At either end are the goals, each consisting of a pair of upright poles, between which the ball must be driven to make a run, the side which first makes twelve home runs being declared the winner of the game and the stakes. The ball is furnished by the challengers, who sometimes try to select one so small that it will fall through the netting of the ball sticks of their adversaries; but as the others are on the lookout for this, the trick usually fails of its purpose. After the ball is once set in motion it must be picked up only with the ball sticks, although after having picked up the ball with the sticks the player frequently takes it in his hand and, throwing away the sticks, runs with it until intercepted by one of the other party, when he throws it, if he can, to one of his friends further on. Should a player pick up the ball with his hand, as sometimes happens in the scramble, there at once arises all over the field a chorus of *Uwǎ'yi Gûti! Uwǎ'yi Gûti!* "With the hand! With the hand!"—equivalent to our own "Foul! Foul!" and that inning is declared a draw.

While our men are awaiting the arrival of the other party their friends crowd around them, and the women throw across their outstretched ball sticks the pieces of calico, the small squares of sheeting used as shawls, and the bright red handkerchiefs so dear to the heart of the Cherokee, which they intend to stake upon the game. It may be as well to state that these handkerchiefs take the place of hats, bonnets, and scarfs, the women throwing them over their heads in shawl fashion and the men twisting them like turbans about their hair, while both sexes alike fasten them about their throats or use them as bags for carrying small packages. Knives, trinkets, and sometimes small coins are also wagered. But these Cherokee to-day are poor indeed. Hardly a man among them owns a horse, and never again will a chief bet a thousand dollars upon his favorites, as was done in Georgia in 1834. To-day, however, as then, they will risk all they have.

Now a series of yells announces the near approach of the men from Raven Town, and in a few minutes they come filing out from the bushes—stripped, scratched, and decorated like the others, carrying their ball sticks in their hands and headed by a shaman. The two parties come together in the center of the ground, and for a short time the scene resembles an auction, as men and women move about, holding up the articles they propose to wager on the game and bidding for stakes to be matched against them. The betting being ended, the opposing players draw up in two lines facing each other, each man with his ball sticks laid together upon the ground in front of him, with the heads pointing toward the man facing him. This is for the purpose of matching the players so as to get the same number on each side; and should it be found that a player has no antagonist to face him, he must drop out of the game. Such a result frequently happens, as both parties strive to keep their arrangements secret up to the last moment. There is no fixed number on a side, the common quota being from nine to twelve. Catlin, indeed, speaking of the Choctaws, says that "it is no uncommon occurrence for six or eight hundred or a thousand of these young men to engage in a game of ball, with five or six times that number of spectators;" but this was just after the removal, while the entire nation was yet camped upon the prairie in the Indian Territory. It would have been utterly impossible for the shamans to prepare a thousand players, or even one-fourth of that number, in the regular way, and in Catlin's spirited description of the game the ceremonial

part is chiefly conspicuous by its absence. The greatest number that I ever heard of among the old Cherokee was twenty-two on a side. There is another secret formula to be recited by the initiated at this juncture, and addressed to the "Red Yahulu" or hickory, for the purpose of destroying the efficiency of his enemy's ball sticks.

During the whole time that the game is in progress the shaman, concealed in the bushes by the water side, is busy with his prayers and incantations for the success of his clients and the defeat of their rivals. Through his assistant, who acts as messenger, he is kept advised of the movements of the players by seven men, known as counselors, appointed to watch the game for that purpose. These seven counselors also have a general oversight of the conjuring and other proceedings at the ball-play dance. Every little incident is regarded as an omen, and the shaman governs himself accordingly.

An old man now advances with the ball, and standing at one end of the lines, delivers a final address to the players, telling them that *Uné'lanú'hi*, "the Apportioner"—the sun—is looking down upon them, urging them to acquit themselves in the game as their fathers have done before them; but above all to keep their tempers, so that none may have it to say that they got angry or quarreled, and that after it is over each one may return in peace along the white trail to rest in his white house. White in these formulas is symbolic of peace and happiness and all good things. He concludes with a loud "*Ha! Taldú-gwú'!*" "Now for the twelve!" and throws the ball into the air.

Instantly twenty pairs of ball sticks clatter together in the air, as their owners spring to catch the ball in its descent. In the scramble it usually happens that the ball falls to the ground, when it is picked up by one more active than the rest. Frequently, however, a man will succeed in catching it between his ball sticks as it falls, and, disengaging himself from the rest, starts to run with it to the goal; but before he has gone a dozen yards they are upon him, and the whole crowd goes down together, rolling and tumbling over each other in the dust, straining and tugging for possession of the ball, until one of the players manages to extricate himself from the struggling heap and starts off with the ball. At once the others spring to their feet and, throwing away their ball sticks, rush to intercept him or to prevent his capture, their black hair streaming out behind and their naked bodies glistening in the sun as they run. The scene is constantly changing. Now the players are all together

at the lower end of the field, when suddenly, with a powerful throw, a player sends the ball high over the heads of the spectators and into the bushes beyond. Before there is time to realize it, here they come with a grand sweep and a burst of short, sharp Cherokee exclamations, charging right into the crowd, knocking men and women to right and left and stumbling over dogs and babies in their frantic efforts to get at the ball.

It is a very exciting game as well as a very rough one, and in its general features is a combination of base ball, football, and the old-fashioned shinny. Almost everything short of murder is allowable in the game, and both parties sometimes go into the contest with the deliberate purpose of crippling or otherwise disabling the best players on the opposing side. Serious accidents are common. In the last game which I witnessed one man was seized around the waist by a powerfully built adversary, raised up in the air and hurled down upon the ground with such force as to break his collar-bone. His friends pulled him out to one side and the game went on. Sometimes two men lie struggling on the ground, clutching at each other's throats, long after the ball has been carried to the other end of the field, until the "drivers," armed with long, stout switches, come running up and belabor both over their bare shoulders until they are forced to break their hold. It is also the duty of these drivers to gather the ball sticks thrown away in the excitement and restore them to their owners at the beginning of the next inning.

When the ball has been carried through the goal, the players come back to the center and take position in accordance with the previous instructions of their shamans. The two captains stand facing each other and the ball is then thrown up by the captain of the side which won the last inning. Then the struggle begins again, and so the game goes on until one party scores twelve runs and is declared the victor and the winner of the stakes.

As soon as the game is over, usually about sundown, the winning players immediately go to water again with their shamans and perform another ceremony for the purpose of turning aside the revengeful incantations of their defeated rivals. They then dress, and the crowd of hungry players, who have eaten nothing since they started for the dance the night before, make a combined attack on the provisions which the women now produce from their shawls and baskets. It should be mentioned that, to assuage thirst during the game, the players are allowed to drink a sour preparation made from green grapes and wild crabapples.

Although the contestants on both sides are picked men and strive to win, straining every muscle to the utmost, the impression left upon my mind after witnessing a number of games is that the same number of athletic young white men would have infused more robust energy into the play—that is, provided they could stand upon their feet after all the preliminary fasting, bleeding, and loss of sleep. Before separating, the defeated party usually challenges the victors to a second contest, and in a few days preparations are actively under way for another game.

THE POWHATAN INDIANS.—As a preliminary step toward an investigation of the ethnology of the tribes formerly inhabiting the coast region of Virginia and Maryland, the writer last spring sent out a number of circular letters of inquiry, calling for information in regard to the number and condition of any persons of pure or mixed Indian blood still remaining within the region designated. The result shows that there is not now a native full-blood Indian, speaking his own language, from Delaware Bay to Pamlico Sound. The only Indians still recognized as such, living within this area, are two small bands, remnants of the once powerful Powhatans, residing on small reservations in King William county, northeast of Richmond. They have long since lost their language and now have probably as much negro blood as Indian, but still pride themselves upon their descent from the warriors of Powhatan, and have recently applied for a share in the school privileges afforded by the Government Indian school at Hampton. The larger band, on Pamunkey river, numbers about 120 souls, known as Pamunkeys. The others live a few miles distant, on Mattaponi river, and number about fifty under the name of Mattaponies. Both bands are governed by chiefs and councilors, with a board of white trustees chosen by the Indians. The following extract from a letter written by William Bradly, the chief of the Pamunkeys, gives an interesting statement of their present condition. Errors of spelling and grammar have been corrected: "It is an Indian reservation in King William county, Virginia, by the name of Indian Town, with about 120 souls. They subsist chiefly by hunting and fishing for a living. They do not vote or pay taxes. We have a chief, councilmen, and trustees, and make and enforce our own laws. I am chief of the tribe, W. A. Bradly. There is a small reservation on Mattaponi river. J. M. Allmond is chief."

JAMES MOONEY.

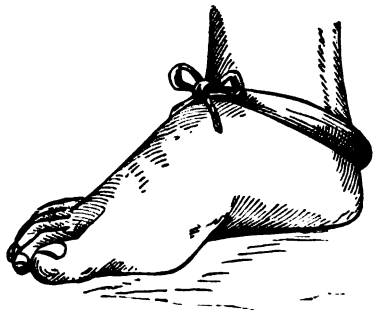
REMARKS ON OJIBWA BALL PLAY.

BY W. J. HOFFMAN, M. D.

Thus far the greater number of Ojibwa Indians of northern Minnesota have been slow to adopt the pursuits of their more civilized neighbors, preferring to spend their time in fishing and hunting and in gathering fruits and berries. In consequence of this mode of life the young men generally possess great endurance and are in excellent physical condition.

During the spring, summer, and autumn much of their time is spent in athletic sports, not so much for pleasure as for the desire to win the wagers of their opponents. The usual sports consist of horse racing, running, and ball play. To become a good ball player one must necessarily be possessed of speed and endurance.

Some of the local Indian runners have adopted an ingenious contrivance to aid in strengthening the muscles of the legs. While at their ordinary avocations, they wear about the ankles a thin bag of shot, sufficiently long to reach around the leg and admit of being tied over the instep. This is removed when occasion requires, and



they claim that they feel very "light-footed." Two years ago one of the champion Ojibwa runners walked twenty-three miles after dinner, and next morning ran one hundred yards in ten and one-quarter seconds, easily beating his professional opponents.

The total number of Indians living in the vicinity of White Earth agency, Minnesota, is about two thousand, and it is easy to muster

from eighty to one hundred ball players, who are divided into sides of equal number. If the condition of the ground permits, the two posts or goals are planted about one-third of a mile apart. Thus one stake only is used as a goal instead of two, as is the rule with the southern tribes. The best players of either side gather at the center of the ground. The poorer players arrange themselves around their respective goals, while the heaviest in weight scatter across the field between the starting point and the goals.

The ball is tossed into the air in the center of the field. As soon as it descends it is caught with the ball stick by one of the players, when he immediately sets out at full speed towards the opposite goal. If too closely pursued, or if intercepted by an opponent, he throws the ball in the direction of one of his own side, who takes up the race.

The usual method of depriving a player of the ball is to strike the handle of the ball stick so as to dislodge the ball; but this is frequently a difficult matter on account of a peculiar horizontal motion of the ball stick maintained by the runner. Frequently the



ball carrier is disabled by being struck across the arm or leg, thus compelling his retirement. Severe injuries occur only when playing for high stakes or when ill-feeling exists between some of the players.

Should the ball carrier of one side reach the opposite goal, it is necessary for him to throw the ball so that it touches the post. This is always a difficult matter, because, even if the ball be well directed, one of the numerous players surrounding the post as guards may intercept it and throw it back into the field. In this manner a single inning may be continued for an hour or more. The game may come to a close at the end of any inning by mutual agreement of the players, that side winning the greater number of scores being declared the victor.

The ball used in this game is made by wrapping thin strands of

buckskin and covering the whole with a piece of the same. It is about the size of a base ball, though not so heavy.

The stick is of the same pattern as that used at the beginning of the present century by the Missisaukas, the Ojibwa of the eagle totem of the Province of Ontario. (See cut, p. 134.)

The game played by the Dakota Indians of the upper Missouri was probably learned from the Ojibwa, as these two tribes have been upon amicable terms for many years; the ball sticks are identical in construction and the game is played in the same manner. Sometimes, however, the goals at either end of the ground consist of two heaps of blankets about twenty feet apart, between which the ball is passed.

When the Dakota play a game the village is equally divided into sides. A player offers as a wager some article of clothing, a robe, or a blanket, when an opponent lays down an object of equal value. This parcel is laid aside and the next two deposit their stakes, and so on until all have concluded. The game then begins, two of the three innings deciding the issue.

When the women play against the men, five of the women are matched against one of the latter. A mixed game of this kind is very amusing. The fact that among the Dakota women are allowed to participate in the game is considered excellent evidence that the game is a borrowed one. Among most other tribes women are not even allowed to touch a ball stick.

The players frequently hang to the belt the tail of a deer, antelope, or some other fleet animal, or the wings of swift-flying birds, with the idea that through these they are endowed with the swiftness of the animal. There are, however, no special preparations preceding a game, as feasting or fasting, dancing, etc.—additional evidence that the game is less regarded among this people.

The Chactas, Chickasaws, and allied tribes of Indian Territory frequently perform acts of conjuring in the ball field to invoke the assistance of their tutelary daimons. The games of these Indians are much more brutal than those of the northern tribes. The game sticks are longer, and made of hickory, and blows are frequently directed so as to disable a runner.

NOTES ON THE NAMES OF THE HEAVENLY BODIES AND THE POINTS OF THE COMPASS AMONG THE POINT BARROW ESKIMO.—During our stay of nearly two years at the U. S. Signal Station, at Point Barrow, we were able to obtain the names of a few of the more prominent stars and constellations.

The sun is called *sū'kūnyū*, and the moon *tū'tkūñ*. They have no name for the pole star, but call the tail of Ursa Major *tū'ktoruin*, which appears to mean "the many reindeer." A similar name for this constellation has been noted both in Greenland and among the Central Eskimos.

Arcturus is called *sibwūdli*, and this star is the timepiece of the seal-netters during the great night-fishing in December and January. The position of this bright red star as it circles round the pole, enables them to judge how the night is passing. Altair is called *ágru*; Vega, *agrúlubwūk*; the constellation Cassiopea, *ibrosi*, and Orion's belt, *tú'atsan*. The Eskimo who gave me the above names—he called me out one bright starlight night, saying, "Now, I will tell you all the stars"—called the Pleiades *patú'kturin*, but Dr. Simpson, of the Plover, applies this name to the Hyades and Aldebaran. This is probably right, for the word evidently means "the sharing out or dividing," as he says, and Aldebaran and the group of the Hyades would very well represent the dead bear with the hunters around preparing to cut him up, as he describes.

We obtained the points of the compass with more exactness than Dr. Simpson did. They are: *únani*, in the north; *ukilyūñnami*, in the northeast; *kábani*, in the east; *kawanikú'na*, in the southeast; *páni*, in the south; *awanikú'na*, in the southwest; *áwani*, in the west; *wūlūñnami*, in the northwest. The four cardinal points, however, *únani*, *kábani*, *páni*, and *áwani*, are the ones most commonly used, and are not employed with great exactness. *Páni*, in the south, is always used for places inland, often with special reference to the hunting grounds at the rivers. A man starting for the rivers always says "*pauñaniä'ktūña*," "I am going southwards."

They have definite names also for the directions of the wind. When the wind blows from any point between north and east it is called *ikūñna*, when from any point between east and south, *nigya*. A south wind is *kilui'ñna*; one from the southwest, which brings high water on the beach, is *úñala*; while *kūñū'ñna* is the name of the northwest wind.

JOHN MURDOCH.

ON THE EVOLUTION OF ORNAMENT—AN AMERICAN LESSON.

BY W. H. HOLMES.

Much has been written upon that ever fascinating topic—the evolution of ornament. All find within this theme the touch of nature that makes the whole world kin. The artistic sense is in some degree developed in the minds of all men, and through its intuitive and constant exercise art has become a rival of nature in the realm of the beautiful—a realm not more fascinating to the devotee of pure æsthetic pleasure than to the earnest but prosaic student of the evolution of culture.

America's lesson concerning this subject has never yet been given that full and careful consideration its importance demands, although that lesson is inscribed in lucid language upon every page of the native record. Of virile and spontaneous growth the art of embellishment in America furnishes many evidences of the correct eye, the facile hand, and the true æsthetic instinct of the native races.

It is impossible to trace back the idea of embellishment to its inception, for the presumption is that it came up from the shadows of the pre-human stage of our existence. It was probably first exercised upon man's own person, but later extended to those objects with which, from generation to generation, he had most constantly and intimately to deal. In the early stages of culture its exercise is not wholly an intellectual, but rather what I prefer to call an instinctive act, and under favorable conditions it so remains far into the stage of culture known as civilization; it does not cease to be measurably unerring in its action until intellect essays to perform the work of instinct—until men begin to think out results instead of feeling them out. The period that sees the full and free exercise of purely intellectual methods witnesses the end of ornament as a living growth. It is afterwards not a unit, a simple thing, a growth, but a composite thing, the parts of which can by no possibility come into full harmony with one another, for their relationship, one to the other and each to all, depends not upon spontaneous or instinctive impulses of the mind, but upon individual judgment,

fallible and uncertain even in the most enlightened minds of this enlightened age.

It is impossible to determine how far beyond the stage of æsthetic evolution, here referred to as instinctive, native American decorative art had advanced at the period of foreign invasion. A nation pursuing the normal course of progress, free from intrusion of ideas from distinct peoples or from higher planes of culture, long follows the lead of instinctive promptings and habitual methods in all decorative elaboration; with such a nation the elements of ornament are not independent or abstract conceptions transferable at will from art to art; they are essentially concrete, each art employing in its enhancement only those motives or elements that arise within the art, or that come to it from without for other reasons than those of mere embellishment.

It is within the limits of this primitive or elementary period that we may best begin the study of the evolution of ornament, for here the phenomena are homogeneous and the processes simple.

In this paper I desire to call attention to that portion of the æsthetic field which pertains to the surface embellishment of the handiwork of man, and more especially to certain set or conventional forms of decoration that, in advanced cultures, through obscure processes of abstraction and transfer, have been adopted into many branches of art and by many peoples. Such are the herring-bone, the chevron, the guilloche, the meander, the fret, and the scroll.

In America two arts are particularly concerned in the early stages of the evolution of these designs, namely, the textile and the fictile arts. By many writers architecture has been given an important and probably a false place in its relation to the evolution of such decorative motives, since many of our aborigines employ almost every form of typical decorative figure in the two first named arts at a culture period long anterior to that at which the native architecture received the first touches from æsthetic fingers.

The elements of ornament utilized in these arts are, in genesis and in character, of two well-defined classes. Those of one class arise within these or cognate arts, and being of mechanical origin are wholly geometric. Those of the other class are derived from nature, and being delineative are primarily non-geometric, but the geometric elements, especially in the textile—the antecedent art so far as decoration is concerned—are first in the field and constitute the beginnings, the first steps of decoration. Delineative subjects

primarily have an ideographic office and when finally introduced into art as pure decorations, serve to supplement, to modify, and to enlarge the realm of the geometric.

When these elements are once taken up by the embellishing faculty they are subjected to the action of two great forces, namely, the mechanical forces of the particular art to which they belong, or into which they are introduced, and the æsthetic forces of the human mind, and it is the combined effect of these forces acting within each art and upon each motive that finally produces the results which we here desire to consider.

All mechanical elements yield readily to the action of these forces and to all the changing requirements and conditions of art. Imitative features yield somewhat less readily to the same agencies, but they are gradually forced into unreal shapes by technical restrictions and in the end assume a geometric character no less pronounced than the technically born elements.

There arise here two questions: First, How do the technical elements inherent in the art develop into certain definite and highly constituted forms? and, second, What part do delineative or nature-derived elements take in producing or shaping corresponding results?

The desires of the mind constitute the motive power, the force that induces all progress in art; the appreciation of embellishment and the desire to elaborate it are the cause of all progress in purely decorative evolution. It appears, however, that there is in the mind no preconceived idea of what that elaboration should be; the mind is a growing thing and pushes forward along the lines laid out by environment. Seeking in art æsthetic gratification, it follows the lead of technique along the channels opened by such of the useful arts as offer suggestions of embellishment. The results reached vary with the particular art and are important in direct proportion to the facilities furnished by it. In this respect the textile art possesses vast advantage over all other arts, as it is first in the field, is of widest application, is full of suggestions of embellishment, and is inexorably fixed in its methods of expression. The mind in its primitive, mobile condition is as clay in the grasp of such forces.

In considering the first question, how do the mechanical elements of ornament develop into highly constituted forms? a close analysis of the forces and suggestions inherent in the arts is necessary. It will be observed that order, uniformity and symmetry are among the first

lessons of the arts, and especially of the textile art. From the very beginning the workman finds it necessary to direct his attention to these considerations in the preparation of his materials as well as in the construction of his utensils. If parts employed are multiple they must be uniform, and to reach definite results, either in form or ornament, there must be constant counting of numbers and adjusting of spaces. The most fundamental and constant elements embodied in the textile art and available for the expression of embellishment are the minute steps of the intersections or bindings which express themselves to the eye both by relief and color. These elements exist fortuitously and without design on the part of the artist. Now, the most necessary and constant combination of these elements is in continuous lines or in rows of more or less isolated figures; the most necessary and constant arrangement of these combinations is in lines following the web and the woof or their complementaries, the diagonals. If large areas are covered, certain separation or aggregation of the elements, relieved or colored, into larger units is demanded, as otherwise absolute sameness would result, a condition abhorrent to the æsthetic sense. Such separation or aggregation is governed to a certain extent by the form of the utensil constructed, but it conforms in every case to the construction lines of the fabric, as any other arrangement would be unnatural and impossible of accomplishment. Textile decorative elements or units—vertical, horizontal and oblique lines, dots, and spaces—therefore, combine and must combine in continuous zones or rays.

Other arts possess in a lesser degree the same classes of mechanical elements, and their technique leads by similar methods to corresponding results.

All agencies originating with man that may be supposed of importance in this connection, the muscles of the hand and eye and the cell structure of the brain, together with all possible preconceived ideas of the beautiful, are, in primitive stages of art, all but impotent in the presence of technique, and, so far as forms and methods of expression go, submit completely to its requirements. Ideas of the beautiful, in linear geometric forms, are actually based upon and originate in the consideration of technical forms; hence the selection for their beauty of certain figures developed in art is but the choice between products that in their evolution gave taste its character and powers.

From the foregoing we see that art furnishes various mechanically

derived elements or devices which combine from necessity in certain definite ways ; that these devices and the suggestions they furnish are taken up and elaborated by the æsthetic sense. Through a consideration of all the known influences of mind and art we can determine the probable direction of this elaboration and the necessary character of the results, but it is impossible to show that any particular design of the highly constituted kind—the fret or the guilloche, for example—was derived through a certain identifiable series of progressive steps ; for as in the evolution of natural forms—of species of animals and plants—the steps of progress are obliterated ; and, furthermore, when we come to scrutinize the matter closely it is clear that any given design may have developed along more than one line and within the art of more than one race. The attempt to give more than a possible or probable genesis of a particular example of design must therefore be futile. Here, as in biotic evolution, we must be content to point out general tendencies and to discover general laws.

The second question, What part do delineations of life forms play in the development of set decorative designs? is now to be considered.

In a very early stage of culture most people manifest decided artistic tendencies, which are revealed in attempts to depict various devices, life forms and fancies, upon the skin or upon the surfaces of utensils, garments, or other objects. These figures are believed in cases to be of trivial nature, serving to amuse, but the weight of evidence tends to show that such work is generally serious and pertains to events or superstitions. The figures employed may in cases be purely conventional, but life forms afford the most natural and satisfactory means of recording, conveying, and symbolizing ideas, and hence predominate largely.

Figures having associated ideas of a superstitious nature come to be employed in all arts suited to their reception, and especially in those branches of art, such as basketry and pottery, extensively employed in superstitious offices.

Now, the fact has been noted and renoted that when natural forms are introduced into art certain modifications of form and character appear which are called conventions or conventionalisms. Such delineations vary from the most literal presentation of which the art and the artist are capable to forms so altered and abbreviated by the forces of convention that they are no longer readily recog-

nized as of graphic origin. These phenomena are well known, and when a large number of examples are considered they may be arranged in a series extending from the most realistic forms at one end of the line to the most mechanical form at the other, the latter presenting to the uninitiated eye a meaningless device.

What is now needed is an analysis of the conditions and forces concerned in this remarkable morphology. Confining our observations to the embellishing phases of art, we find that three principal factors are concerned: First, the æsthetic desire in the mind of man; second, the technical forces and other mechanical agencies concerned in the practice or utilization of the art; third, the association of ideas.

1st. It is the æsthetic idea that calls forth the effort and presses forward to further and further elaborations of embellishment.

2d. It is clear that each art is endowed with its own special technique, and that figures acquired from nature must express themselves in terms of the several techniques. If the construction is geometric the figures must take on a geometric character; if plastic a plastic character, and if graphic a graphic character. Other related mechanical agencies in a like manner take part in determining the character of the results.

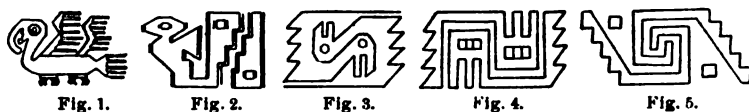
3d. Associated with each graphic motive, as I have already pointed out, there is an idea, as otherwise it would not in primitive stages have come into use at all. The expression of this idea may or may not be essential or desirable to the decorator, but as long as it remains essential or even desirable, the tendencies of the first and second forces towards conventionalism will be restricted or neutralized by this necessity of graphically expressing the idea. This tendency to resist conventionalism constitutes what may be called the conservative force in art. If the idea is strong all the tendencies of art to trim, restrict, or expand will be in vain. The idea dominates the technique. It is in this way that some national art characteristics originate.

Nations practicing arts having pronounced technical characters, such as weaving and architecture, and possessing at the same time few or feeble ideographic elements, will develop a highly geometric conventional decoration, while nations practicing arts with less pronounced techniques, such as modeling, sculpture, and painting, and who make ideography a prominent feature, will have a system of decoration characterized by imperfectly defined conventionalism.

Now, what result follows the united and simultaneous action of all these forces upon natural forms? It is plain that on the whole the conventionalizing agencies are the stronger; that they are to a certain extent irresistible; hence as the ideographic or conservative feature becomes gradually weakened, as it usually does with time, they gain full dominance, and all forms then lend themselves with the utmost freedom to the enhancement of beauty under the dominance of the mechanical agents and the demands of the æsthetic sense.

A few examples will assist in making these statements clear. Let us take an illustration from the textile art of Peru—from a body of products belonging to one period and to a single community.

It may be assumed that fabric-making had long been practiced and highly perfected by the Incas, and that geometric ornament had been very extensively employed when the weaver first essayed, prompted perhaps by æsthetic but more probably by superstitious motives, to introduce the delineation of a bird into his fabric. We will suppose that he attempted an ordinary graphic delineation, but that owing to the difficulties—the restrictions of the technique of the art—the best he could do is shown in Fig. 1.



The bird in textile art transformed by technical forces.

But this degree of elaboration could not be maintained under all conditions of the practice of the art, and lines were simplified, parts omitted, and forms accommodated to the technique and to the geometric outlines of the original technical ornaments until they could easily be introduced into or substituted for them. The bird delineations were reduced to bird-like figures which could be carried serially along the zones to be decorated and with as much ease as could the purely geometric figures. Thus these bird figures merged into the elements or units of which current ornaments—meanders, frets, and scrolls—were made up, as shown in Figs. 4 and 5. It is plain also, whatever the life form introduced, that when the delineation became reduced to this wholly conventional condition it merged with equal ease into the frets and scrolls, becoming undistinguishable from its otherwise derived neighbors. There is no

doubt that in time this introduction of nature-derived elements led to new forms and combinations and to great elaboration in purely conventional design. It may be noted also that the idea associated with the graphic bird may still be retained by the derivative geometric unit, and possibly it (the idea) may even finally extend to the whole line of units—to the current ornament.

In the plastic or the plasto-graphic arts conditions and processes are quite different from those of the geometric arts. Let us take one illustration of the introduction of a graphic design into vase-painting. Here the technical forces are neither so pronounced nor so rigid. With a free hand the decorator sketched in figures borrowed from mythological art and elaborated them according to his own idea of the demands of the subject and of the particular embellishment desired. But strangely enough we observe marked and peculiar conventionalisms some of which may be inherited or copied from the sister art basketry, but most of which are due to the inherent tendencies of the art. Let us examine briefly the nature of these. First. What effect has the shape of the vessel and the space at command to do with the form and character of the design? The spaces available for ornament are the neck, the shoulder, and the expanded portion of the body of the vessel. These form three encircling zones, separated by more or less abrupt changes in the profile of the vase. Now, any ordinary figure, as, for example, that of an alligator, introduced into one of these zones does not cover its whole extent, and a number of the figures must be introduced. This is readily done, but the narrowness of the zone tends decidedly to elongate each figure, and there is at the same time a marked, probably a habitual, tendency to unify the design by connecting the series of elongated figures in a linked or continuous line. It is not surprising, therefore, that such results follow as are traced in Figs. 6, 7, and 8.

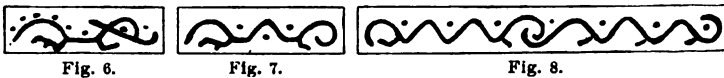


Fig. 6.

Fig. 7.

Fig. 8.

Alligator motive modified to suit varying spaces.

But again, if the spaces to be decorated are square or nearly so, as often happens, the result is very different, for the figure must be contracted and abbreviated in various ways to be included in the space, Fig. 9.



Fig. 9.

Alligator figure crowded into a sub-rectangular space.

And again, if the spaces are round or oval, distinct classes of results are reached, as is shown in Fig. 10. In such a case the figure, no matter what its nature, must be crowded or coiled up.



Fig. 10.

Reptilian figure modified by inclusion in a circle.

It will be observed that the free-hand method of presentation, even when there is no restriction as to space, results in conventions peculiar to itself. Instead of the sharply angular character seen in woven figures and to a considerable extent in engraved designs, rounded forms and flowing outlines appear; in place of the typical angular meander, guilloche, and fret, appear corresponding forms in curves—that is, the waved line, the twined or plaited lines, and the scroll.

In free-hand as well as in geometric introduction of life forms into ornament one of the most marked and constant tendencies is toward greater simplicity. This is due in part to the great difficulty of delineating the complex and subtle forms and partly to the necessity of extreme simplicity of elements that must accommodate themselves to eccentric spaces and to constant repetition in connecting series. Other cultures than those developed on American soil present kindred phenomena, though perhaps with less conciseness and clearness tell practically the same story of the natural history of conventional ornament.

A few of the salient points may now be briefly reviewed. It has been shown that in primitive stages of culture embellishment is

practiced instinctively and in habitual ways and after habitual methods, and that it utilizes elements inherent in the art practiced, supplemented later by ideographic elements appropriate to that art. That as intelligence increases habitual or instinctive methods give way to more purely intellectual methods and ornament is abstractly treated; elements are freely taken from their original and consistent associations and, under the supervision of what we call taste, utilized in all arts in which embellishment is a feature, and it appears that this use being guided by individual judgment is necessarily incongruous and imperfect.

Owing to the peculiar conditions under which the American tribes existed, their ornamental art, although abnormally developed, had not passed so far beyond this primitive instinctive stage as to confuse the evidence relating to initial steps.

In America are found all the important conventional designs which characterize the art of the old world, and the oriental scroll and the classic fret were more freely used by the simple barbarians of the lower Mississippi and of the great Colorado plateau than they ever were by the Greek or by the Assyrian.

It has been shown that all geometric designs may have developed, and probably did develop, within the arts and from elements inherent in these arts; that this occurred through the æsthetic desire of the mind dominated by the mechanical forces of the arts, and that in this country the textile and the fictile arts are most deeply concerned in this evolution.

It is seen that as art progressed animate forms were gradually introduced into decoration, not because of their capacity to beautify, but on account of ideographic appropriateness; that these life forms, when once within the realm of decoration, were acted upon by the mechanical forces of art and gradually reduced to purely geometric shapes; that each one of these figures has in all probability a complex genesis, since almost identical forms may have been evolved by independent nations through any one or through many of the arts, or that any creature extensively portrayed in any art of any people may, through the mechanical conventions to which it was necessarily subjected, be transformed by imperceptible steps into any one or into all of the typical geometric designs; and it may be added that, so far as ideography and symbolism are concerned, it appears from the above statement that *ideas associated with any one of our conventional decorative forms may be as diverse as are the arts, the peoples, and the original elements concerned in its evolution.*

CLIMATIC INFLUENCES IN PRIMITIVE ARCHITECTURE.

BY BARR FERREE.

Climatic changes, variations of temperature and rainfall, differences of geologic structure and of animal and vegetable products, the nature of the soil, and the topography of a country—in short, all the factors that constitute environment—are the most important and universal elements in determining the form and construction of the dwelling. Sociological influences, such as mode of life, government, mental status, and the like, are of importance chiefly in the earlier stages of society, and their effects upon architecture gradually lessen with the progress of civilization.

Climatic influences can be traced in our own buildings as well as in those of the most primitive races, in the structures of the nineteenth century as in those of prehistoric times. The builders of the great churches of Europe pitched the roofs at a high angle to permit the easy discharge of snow; in the milder climate of Italy such a course was unnecessary, and a lower or flat roof is found. Large windows, to admit light and heat from the sun, are the rule in the north, while small ones, to keep out the glare, are characteristic of the south. The very mouldings are frequently cut so as to carry off the water or to protect delicate carvings placed beneath them.

The influence of climate and of environment extends to the art of painting. The characteristic features of the various schools of landscape painting are largely the reflection of the environment of the artist. The history of culture and of civilization abounds in illustrations of the influence of environment upon the arts and development of man. In the earliest historical periods the most advanced races dwelt in warm climates, or those in which natural phenomena were uniform. The great nations of antiquity, the Egyptians, Assyrians, Persians, Greeks, and Romans, all originated and thrived in semi-tropical districts. In America the most advanced races, the Aztecs and Peruvians, were likewise inhabitants of hot countries.

It is a remarkable fact that the centre of civilization has shifted

from near the equator towards the poles. To-day the most progressive races inhabit the temperate zone, while the stolid and stationary ones are in the frigid and torrid where there is little variation of temperature. It would almost seem that a diversified climate, one of sharp contrasts of hot and cold, of rain and snow, was essential to a progressive civilization, and at all events it is in such that the intellect attains its most vigorous growth. In Europe the Germans and English are in advance of the Italians and Spaniards, and in our own country the people of New England claim to be ahead of their fellow-citizens in the south. In whatever direction civilization is tending, it is at least safe to say that a uniform environment throughout the world would result in uniformity in thought, in art, in manufactures, and in construction, and to variation in environment more than to any one cause differences in these particulars are due.

Among primitive peoples the influence of environment on construction is very marked, and to it differences can be traced which are not noticeable among advanced races. First of all may be considered the influence of wind. This was an important element in determining the development of the rectangular dwelling, which arose in a desire to exclude it. In part of Tasmania, for example, the natives used windbreaks, but in the western portion of the island, where the weather was more severe, huts were built of wattle and daub. A common method of gaining shelter, illustrated by the Australians and the Coroads, is by placing the entrance to leeward; very frequently no wall at all is built on this side, the ingenuity of the builders being confined to keeping the wind out on the others. The Bachapin houses have a number of devices for excluding the wind. They are surrounded by a fence of closely interwoven twigs and branches, with an opening that conforms to the shape of the body, being wider at the top than at the bottom. The house has two walls, an outer and an inner one; the former is of sandy clay, manure, or grass, thrust in between poles that support widely projecting eaves. The inner wall is without windows and encircles the portion of the house used for sleeping and storing purposes. The roof is constructed in a particularly thorough manner of poles bound with acacia bark, over which sticks are tied transversely, and covered with a thatch of long grass or straw, which in turn is held down by twigs inserted at both ends. Few structures exhibit so many special expedients to protect the inhabitants against the inclemency of the weather as this, but there is a very large class of dwellings,

especially in colder and more windy countries, that show attempts to exclude the air. A favorite device is a single small entrance, which was much used among the Indians of North America, and it need scarcely be pointed out that for this reason openings are closed with doors or shutters, or else a curtain, mats, skins, cloths, varying with the products of the country or the wealth and knowledge of the builders, is hung before them, and protection thus obtained not only against the severity of the elements but from prying eyes.

In some tropical regions it is intensely hot by day and cold by night, a condition of affairs that would naturally lead to the building of houses that could be opened in daytime and closed at night. An interesting example is furnished by the houses of Samoa, that have a low wall, the upper portion of which is closed at night by screens. A similar end is sought in the low circular huts of the Tartars of Central Asia. They are intolerably close by day, but at night, owing to the piercing winds, are as comfortable as they are necessary to the preservation of life.

In direct contrast to this system of construction, which is designed to exclude the air, is the system arranged to give it free access. The latter is to be found in all hot countries. Sometimes the dwelling is open at one end; at other times it is without any walls at all. The former may be found among the Tannese, the latter among the Adamese. The Tongans build in a similar manner, but with the roofs descending nearly to the ground. The shed, of course, is the form best adapted to permit the free circulation of air, and it appears in a great variety of forms. The Conibos Indians of Peru supply an excellent illustration, building in the clearings under the direct rays of the sun huge open sheds capable of accommodating three families. In the Hawaii Islands a different custom prevails, sheds being used in summer, and in the cold season dwellings with low walls and high roofs.

Rain also has an important influence upon construction. As has been noted, flat roofs obtain where there is little or no rain, pointed or inclined ones where there is an abundance of it. While this distinction is broad enough to be observed among all peoples, in all parts of the world, and in all degrees of civilization, there are a number of special expedients that have been devised by different peoples as the result of local conditions or their own knowledge. The Abipones, whose dwelling is so rude as to consist simply of a tent of two poles and a mat, dig a trench to carry off the rain. The

granaries, which almost invariably form part of an African village, are frequently furnished with projections that extend beyond the walls to carry off the rain. An interesting series of examples of the same regard for natural requirements is furnished by the stone edifices of more advanced peoples. In Syria and Egypt, where the rainfall is too light to be taken into account in construction, roofs are flat; in Greece and Italy, where it is light but periodical, the roofs are pitched at a low angle; still farther north, in central Europe, where rain and snow are abundant, the roof is sharply pitched. The richly domed roofs of India may have originated through the same cause. A leading characteristic of Indian architecture is a succession of pilaster-like ornaments, surmounted with a dome or roof covering. In a rainy district the simplest way to protect an upright column or post is by a covering, and it is quite likely that such a primitive arrangement may have suggested to the Indian architect the idea of his many domed walls where each upright member appears to have a roof of its own.

Differences in construction result from differences of temperature, as when the summers are short and hot and the winters very long and cold. Under these circumstances the usual method is to occupy a different dwelling each season. Summer houses are light in structure while winter ones are built with a regard to warmth. The Chipewya, for example, in summer use a primitive structure formed by two poles meeting at the head, a ridge-pole, and a strip of birch bark. In the winter they build circular lodges accommodating two families, covered with birch bark held down by sticks; the entrances are closed with blankets. The Comanches have arbors of green boughs in summer and conical lodges of buffalo skins in winter. The Indians of Cooper's creek use windbreaks of branches or stalks of marsh-mallows in summer, and in winter rain and wind-proof lodges of sticks covered with grass or weeds with earth or sand thrown on the top and beaten down. In fact, the practice of building two kinds of dwellings for the different seasons is very common among the American aborigines. A similar custom is found among other peoples. The Ostyaks build huts of birch bark for the summer and for winter yurts of wood and earth, with floor sunk in the ground for greater warmth. These winter houses are occupied by several families, while the summer ones are used by one only. Other north Asian peoples, as the Kamtschatdales and Tschutski, have similar arrangements. The summer houses of the former are elevated

on posts, while the winter ones are partly sunk in the ground. The Innuits live in tents of skins during the summer; as the weather becomes colder they build combination houses of sheets of ice with a roof of skins, and when the winter has finally set in they resort to the typical house of blocks of snow and ice. The Todas, though living in a warm region, have duplicate and triplicate dwellings permitting a seasonal change of abode, a sort of primitive "town" and "country" house arrangement.

A change of dwelling is not, however, necessarily confined to districts having strongly marked seasons, but is sometimes due to change of occupation. The Brokpas of the Upper Indus build separate houses in the fields in summer, while in winter they use communal dwellings. Thus each family is enabled to cultivate its own piece of land in the warm season, while the whole tribe huddle together for greater warmth in the winter. The Zuni and other pueblo tribes of New Mexico adopt a similar method. The Dakotahs erect permanent communal dwellings of birch for the use of the agriculturists in summer, and at other times live in temporary lodges of skins, thus reversing the process of the Brokpas. Temporary tents of poles covered with mats are used by the Chinooks during the fishing season, and permanent board dwellings at other times.

The leading climatic features that have been considered produce what may be termed special variation in structure. These factors, wind, rain, snow, and change of season, do not produce uniform effects, some tribes building more with reference to one than to another. They may, therefore, for the sake of convenience, with the additional element of earthquakes—which cause readily recognized features wherever they occur—be classed together under the general term of secondary climatic agencies.

But there is a much more important element due to climate, and that is the material employed. Difference in material is traceable to the influence of climate and geological formation, and to this cause chiefly is to be attributed the many variations in structure to be found in all parts of the habitable globe.

The want of an abundant and readily procured building material is productive of all manner of expedients. In a treeless country the first resort is to skins. Numerous illustrations of this were to be found among the North American Indians before their habits were changed by civilization. The Comanches, the Dakotahs, the Chippewayans, and the Snakes are but a few of those who used

skins for the want of a better material, although it is to be remarked that for the dwellings of nomadic tribes skins are the most serviceable material. The Patagonians and the Arabs used skin tents because timber was scarce. The Mandans were extremely sparing in the use of logs in their houses, for in the region in which they dwelt trees grew only in patches, and being confined to the bottom lands between the banks of the rivers were difficult to transport.

From the use of skins the next step was to the use of clay. The rudest method is simply to spread it over a wood frame-work, as was done in the case of the Mandan huts. This, however, implies only a slight advance in technical skill. A higher stage is exhibited in the houses of the Ashantee. These are formed of a slight frame-work of wood, thickly coated with clay, and smoothed off to resemble columns and paneled walls, a system not very unlike that of the Chaldæans and Assyrians. These structures form a sort of stepping stone to the use of brick, which is at once the highest and most developed method of employing clay as a building material, though moulded terra cotta may be considered to be a still further specialized form of it. The Afghan huts furnish an interesting series. Some, as at Khandahar, are entirely of mud bricks, no wood at all being used, not even in the roof. Others, as in the Pischin valley, have roofs partially constructed of wood, which is carefully carried in each migration. The settled Arabs of Asia usually build with sun-dried bricks. In the case of more advanced peoples there may be noted the use of brick in Assyria and of stone in Egypt, the material in each instance being the most readily obtainable. It would have been quite impossible for Assyria to support its population had it not been for the use of clay as a building material. The arch was first used in treeless countries, or at least where large building materials were not to be had, and may be said to have originated in the use of clay. The adobe houses of North America owe their origin to the absence of any other suitable material or the difficulty of obtaining one.

Some of the above examples show peculiarities of construction due to the presence of certain kinds of materials only, but there are instances where a choice has been made among several kinds of materials. Squier describes houses at the mouth of the Rio Ranees, in Peru, that are built of a peculiar tough turf found in the vicinity. Tule is used in the rainless districts of Peru and California. The use of a certain abundant substance in one district results in pecu-

liar methods which are absent in structures in which they are not used.

The use of stone as a building material resulted from the want of a better and more easily handled substance. The first stage, where some timber can be had, is to build a wall of stone and a wooden roof. Such dwellings are found among the Maiwar Bhils. Stone forms the fabric of the most important edifices of Egypt, and the Doric temple itself, as M. Viollet-le-Duc has so ably shown, is a stone structure admirably designed and executed and expressing in the minutest details the adaptability of the material to the various uses to which it is put. The size of the stone has an important influence on the appearance of the building and the method of construction. In the stone pueblos of America three kinds of walls were used—one of alternate layers of large and small stones, another of layers of large stones, and a third of rubble-work. Lintels are found where large stones can be obtained and arches where only small ones can be had. Incidentally, also, the use of small stones led to the introduction of plastered or stuccoed surfaces.

The Egyptians built hugh columns of small stones, covering them with plaster in order to produce the effect of monoliths. The grand yet simple results of Greek architecture were obtained chiefly by the use of large materials, while the richness and variety of the Gothic results from the constant use of small stones. The Romans relied almost exclusively upon the plaster coating or veneer of costly marble laid on walls of ordinary brick for the full effects of their buildings. The use of courses of stone naturally suggested the ornamentation of each row or of certain rows. Soft stone was still further instrumental in the development of ornament. Lastly, it may be noted that a taste for polychromy follows the presence of varied colored stones. The rich appearance of the buildings in the volcanic districts of France furnishes ample illustration. Stone was a substance not much employed by primitive builders, as its use implied considerable technical knowledge, and no works of importance could be accomplished except by means of the concerted action which is only found in semi-civilized or civilized communities. A number of stone huts are to be found in various parts of Europe, dating from a remote past if not from prehistoric times, that are scarcely more than stones piled up with more or less regularity. Few of these exhibit half the care and labor to be noted in the dwellings of the most primitive Africans.

Artificial building material came into use when no other was at hand and when the tribe possessed sufficient technical knowledge to produce it. The Kalmucks use frames of willow covered with felt, made of a number of pieces fastened together with thongs or hair ropes. The Khirghiz build similar tents, but made of reed mats held down by bands embroidered with needle-work. These mats are covered with an outer layer of felt, held in place by white belts crossing each other in various directions. The yurtas of Mongolia are formed of a lattice of wooden laths brought from the Khalka country, where they abound. The roof is of light poles, and the whole is covered with sheets of felt that are doubled in winter. The completed tent bears a close resemblance to a heap of earth, an appearance that may have been sought as a protection against enemies.

Sometimes a material is used because it is the most convenient, though a better may be had with little trouble. The Chinese mud hut is a case in point. It is composed of mud and millet stalks and has numerous advantages in the eyes of the natives. The materials can be had on any plain for the mere picking up. In addition each man can build his own hut, an advantage not to be despised where incomes are microscopic. When the floods and the rain threaten to dissolve the habitation, the owner takes his family and household goods to the roof, and as the water gradually disintegrates the walls the whole structure sinks softly down, safely preserving the precious freight. The ranchos of Chili, built of twigs and rushes and plastered with mud, are constructed so as to be easily taken down and rebuilt.

Closely allied to houses built entirely of mud are those constructed of wattle and daub. Such dwellings are of frequent occurrence, and illustrations are supplied by the Mundrucus of Brazil, the Araucanians, the Malagasys, the Gonds, and many others. In the northern interior of Australia the natives constructed huts of boughs covered with grass and leaves, with a thick outer covering of mud. The Fuegians sometimes placed turf above their shelters of skins, bark, or grass, and the dwellings of the Ostayks, the Tschutschi, and the Oonalashka are all covered with earth. Such structures are to be found not only where better material is wanting, but where the people are too indolent to devise better methods.

Further variations in buildings are due to the fact that a peculiar material is within reach which gives a character to the architecture.

The light and graceful character of the dwellings of eastern Asia is due to the abundance of bambu. Among the people using this eminently adaptable material are the Nagas, the Khryings, the Javanese, the Sumatrans, and a host of others. It is the foundation of all east Asian building, and though it reached its highest form and fullest development with the Chinese and Japanese the less advanced races well understood its capabilities and made good use of it. The Javanese houses are built of a frame-work of bambu and poles covered with plaited bambus or reeds. The roofs are of reeds, leaves, or pieces of bambu split and applied to each other by their alternate concave and convex surfaces. The floors are of split bambus. The Sumatran dwellings are largely built of palupo, which is bambu opened and made flat by notching the joints on the outside, cutting away the insides, and drying the shell in the sun. It is sometimes fastened with nails, sometimes woven together. The floors are of bambu, with an upper layer of split ones. The roofs are varied. Some are covered with palm leaves, formed into sheets, doubled at one end over a lath and tied to the rafters; others are of narrow split bambus laid so as to form a triple covering; others are covered with a substance resembling horse-hair; and still others have split bambus arranged as in the Javanese houses. The high arched roofs of the New Guinea houses are due to the elasticity of the bambu. It is generally used throughout the east for floors even if in no other part of the dwelling, as it is more readily worked than palm wood. All these structures exhibit the simplest and most obvious applications of bambu to the needs of construction, but the full development, as seen in the houses of China and Japan, is so close to the methods of civilization as to remove them from the scope of this paper.

Other trees tend to the formation of characteristic structures. Palm leaves are extensively used for thatching wherever they are found. In the Brierly Islands the houses are built of slender poles lashed together with rattans and thatched with grass which still has the roots attached to it, over which are placed a few leaves of the cocoa palm. In the dwellings of the New Zealanders and the Waraus palm is also employed as a thatch. The Arawaks of Guiana build their houses entirely of palm. Grass is also very generally used for thatching purposes.

Bark, when it can be obtained in sufficiently large pieces, forms an excellent building material. Examples of its use have already

been noted in the shelters of the North American Indians and the Australians. In high latitudes a variety of expedients are resorted to in order to supply what nature has denied. Snow and ice are pressed into service when nothing else is to be had, and form good and serviceable shelters. No useful substance is permitted to be wasted, and driftwood is treasured when it can be obtained. The Innuits usually build with snow when they can get no drift-wood. The bones of animals are sometimes used, so pushed for means of shelter are those living in the extreme north. The Tschutski build a frame-work of wood and whalebones, and other northern people construct dwellings entirely of the bones of whales, walruses, etc. These structures are circular, dome-shaped huts of ten or eighteen feet diameter; the lower part is of stone, the upper of bones, that gradually incline inwards, meeting at the top. The crevices and the outside are covered with earth, and in the winter an additional layer of snow is carefully spread over all.

Apart from the use of animal skins and bones in building the dwelling there are certain structural devices intended to prevent the living animal from interfering with the comfort and safety of man. Some authorities affirm that the abundance of reptiles in the island of Timour led to the custom of elevating the houses on posts. In the dwellings of the Brierly Islands, which are also elevated, a special device is introduced as a guard against rats, consisting of an oval disk placed between the joist and the post. In some parts of Africa it has been stated that the natives build their huts in trees as a protection against lions. Nearly all African granaries are elevated on posts to keep the grain safe from the ravages of rats. The records of African travel abound with accounts of the ravages of the dreaded white ants and the care that must be taken to protect everything edible in the way of wood or other substances.

Some few of the leading characteristics of primitive architecture have been passed in review. Viewing the subject from the standpoint of the influence of the environment only, many features which are to be attributed to sociological influences have been omitted.* Limiting ourselves to this position, it is evident that however spontaneous architecture may be at the present day, however much it may be the creation of the fancy, the expression of a refined and cultivated

* See "Sociological Influences in Primitive Architecture," *American Naturalist*, January, 1888.

taste, a desire for the odd or the beautiful in its earliest conception, its rudest forms, it was nothing more than the action of the environment on the mind of man. If the climate was warm he built himself a dwelling that gave him as much air as possible; if it was cold all his resources were devoted towards obtaining heat. If it rained regularly or constantly he gave his roofs a sharp incline; if there was no rain the roofs were flat and afforded a pleasant place of resort in the cool of the evening. If there was no stone he made bricks, and if a pliable wood was at hand he devised a light form of structure the very ornamentation of which was in harmony with it.

In primitive architecture there was no effort for effect—no loss of material; primitive man had neither the time nor the intellect to spend on structures that are dictated solely by fashion or caprice. He advances slowly and with caution, evolving beforehand his methods of procedure. From natural shelters like caves he gradually progresses through the various stages of a single windbreak to a partially closed hut, and finally to the perfected form of an enclosed dwelling. In the case of sedentary tribes these dwellings are constructed with great care and skill, and sometimes attempts at ornamentation are made. With nomadic tribes there is less architectural advancement, but each applies his knowledge and means as best he may. To us, with our comfortable homes, our huge hotels, our gigantic office buildings, our churches, our theaters, our railway stations, our factories, our elevators, our steam heat, our electric light, and the thousand and one conveniences and necessities of modern life, the structures of primitive peoples appear meager and insufficient. It should be remembered, however, that many of our modern conveniences are intended to supply artificial wants and that the necessities of to-day were unknown the day before yesterday. The hut of the Adamese doubtless answers all his ideas of comforts and is eminently adapted to the life he leads. We, on the other hand, are constantly striving for changes and improvements and are never satisfied with the best results we can obtain. Primitive architecture may be stationary—it may exist in forms to-day that were employed thousands of years ago—but it is the faithful reflection of the environment and is thoroughly suited to the uses to which it is put. No further confirmation of this is needed than the fact that when Europeans take up their abode in tropical countries they follow the native methods of architecture so far as a prejudiced judgment will permit.

Nothing can be more rash than to attempt to formulate a law of architecture. The records of primitive architecture illustrate no law other than the action of environment and sociology. We may indeed say that man uses the best material known to him in the best way he can. This is, in fact, but one of the great principles underlying all architecture, both primitive and civilized, though perhaps it is best illustrated in primitive forms.

BRASILIAN INDIANS.—An important paper on the Indians of Brasil has recently appeared in *Archivio per l'antropologia e la etnologia* (the journal of the Italian Society of anthropology, ethnology and comparative psychology, published at Florence). The paper is by Dr. Alfonso Lomonaco, and is entitled "Sulle razze indigene del Brasile, studio storico." It occupies pages 17-92 and 187-270 of the first two numbers of the current volume (v. 19, 1889) of the *Archivio*. The paper begins with an introduction, and is divided into four sections, as follows: part 1, "The native races at the time of the discovery of Brasil," treating of the Tupy, the Tapuyas and the Aymores or Botocudos; part 2, "Brief remarks on the history of the natives of Brasil from the discovery of the country to the present epoch;" part 3, "The present native tribes of Brasil," treated under the following headings: "The present number of savages in Brasil; their subdivisions, based on the classification of Martius; the Tupis; the Ges or Crans; the Goytorkazes; the Guerens or Crens; the Gucks or Cocos; the Parecis or Parexis; the Guaycurùs; the Arnaks; the tribes of the Rio Purùs studied by Chandless; the tribes of the Xingù and of the upper Amazon; mixed races of Brasil; domesticated Indians; the future of the present natives; conclusions;" part 4, "Language and literature of the natives," including twenty-three Tupi legends collected by Dr. Cortes de Magelhaes.

A short bibliography is appended to the paper and a plate of typical Brazilian Indians.

JOHN MURDOCH.

THE OLECRANON PERFORATION.

BY DR. D. S. LAMB.

In a collection of sixty-nine skeletons and parts of skeletons of prehistoric Arizona Indians from the valley of the Salado I found that 54 per cent. of the eighty-nine humeri showed the olecranon perforation; forty-three of the right side, with nineteen foramina, or 44 per cent., and forty-six of the left side, with twenty-nine foramina, or 63 per cent.

In another collection from ruins of the ancient Seven Cities of Cibola, near Zuni, New Mexico, were sixty-one humeri, with twelve foramina, or 20 per cent.; thirty right humeri showed two foramina, or 7 per cent.; thirty-one left, ten foramina, or 32 per cent.

In a third collection of Indian bones from mounds in different parts of the United States, including New York, Maryland, Illinois, Wisconsin, and Dakota, there are sixty-two humeri, with seventeen foramina, or 20 per cent.; thirty-five right, with seven foramina, or 20 per cent., and twenty-seven left, with ten foramina, or 37 per cent.

The Army Medical Museum also contains forty-eight skeletons from nineteen of the existing tribes of Indians. Of these ninety-six humeri the foramen is present in but five, or 5 per cent., a remarkable contrast with the prehistoric races. One of these skeletons showing the foramen is of a Sioux only about twenty years old.

There are eight skeletons of negroes and mulattoes with but one olecranon foramen, or 6 per cent. Standing alone, this would seem to favor the statement of Pruner-Bey and others that the foramen is not present in the negro race. There is a skeleton of a Chinese woman showing the foramen present on both sides, and one of a Frenchman showing it on one side.

In the pathological series of the Museum are 298 humeri, with twenty-two foramina, or 7.5 per cent. Of these humeri 160 are of the right side, with six foramina, or nearly 4 per cent., and 138

left, with sixteen foramina, or nearly 12 per cent. These bones are nearly all from soldiers in the military service, and principally white, thus disposing of the suggestion that the foramina are found only in the female sex. One of the injured bones is from a Mexican boy.

With few exceptions the skeletons in the Museum are either infantile or adult. It is the more interesting, therefore, to know that of the adolescents two show the foramen.

In my own private collection of humeri, twenty in number, there are six foramina, or 30 per cent. ; eleven are of the right side, with two foramina, or 18 per cent., and nine of the left, with four foramina, or 44 per cent. These humeri were obtained from cadavers used in dissection, and as most cadavers in this locality are of negroes or mulattoes it is reasonable to suppose that most of these humeri are from the negro race.

A review of the humeri in the above collections shows that the foramen was found in the proportion of 13 on the right side to 27.5 on the left, or more than twice as often on the left side.

The examination covered nearly 650 humeri and seemed to establish—

- 1st. The greater frequency of the foramen in the ancient peoples.
- 2d. Its greater frequency on the left side.
- 3d. Its occurrence in adolescents, as well as mature individuals, in both sexes, and not confined to any one race.

The most important question which arises is as to the use and significance of the foramen. It is obvious that the more the coronoid or olecranon fossæ are deepened the thinner becomes the partition, and a step further produces a perforation. This deepening and perforation increase the extent of flexion and extension of the forearm. What was there in the habits of the prehistoric and ancient peoples which needed this increased flexion or extension and resulted in the foramen? and why should this be more frequent on one side, and that side the left?

To arrive at a solution of these questions it seemed necessary first to ascertain in regard to its presence in the lower animals and compare the results with their habits.

I accordingly examined the specimens displayed in the United States National and Army Medical Museums. Some perforations appear to have occurred in the preparation of the specimens, and

these I did not count. There was seldom any difficulty in distinguishing the true foramen, which always has a smoothly rounded, usually oval, margin; no such opening could be produced by accident. Species are illustrated in museums by single specimens; occasionally by two or more. The presence or absence of the foramen in any one specimen cannot be taken as an index for the species, since it may be simply an individual variation; but where specimens of several species of the same genus show it, we are justified in assuming its common occurrence in those species, if not in the genus.

When the foramen is large, especially when the animal is young or small, I think we have a more certain indication of its common occurrence in that species than where the opening is small and therefore more possibly a variation. I believe that the foramen is formed in the latter part of the period of development of the individual; it is much more rarely found in the early part, although I cannot be so certain of this, because the museums contain but few skeletons of the earlier periods.

The foramen has not been seen in any but the Mammalia.

The testimony for the anthropoid apes is as follows: Several authors (29, 42, 49) have noted it in the chimpanzee. Hartmann, however, found it but once in four cases, and then on the left side. I have seen one specimen. It has been seen in the gorilla (47, 48, 49). In Kneeland's case it was only on the right side. Hartmann found it twice in four individuals. I have seen two specimens, one an old female-with the openings, the other an old male without them. Hartmann failed to find it in the orang-utan, and Desmoulins says it does not occur. I have seen three specimens, in two of which it was present and the openings were large. Mivart says it is sometimes present in the gibbons (*Hylobates*); Desmoulins that it is not found in *H. syndactylus*. It was absent from two specimens, a *H. lar* and *H. leuciscus*, which I have examined.

The old-world monkeys include more than a hundred species. The testimony for the *Colobinae* is negative. Meckel says it is present in the *Cercopithecinae*; Mivart that it is found sometimes in the green monkey. I have seen it in this and also a vervet, but only on the right side. Meckel says it is present in the white-crowned mangabey; it was absent from the sooty mangabey. Mivart says it is sometimes present in the genus *Macacus*. I have seen it in the toque monkey. It was absent from the bonnet monkey and black

ape. The best testimony is for the dogheaded baboons. Meckel found it in the Arabian baboon. I have seen it in the anubis and in one of two chacmas. Meckel says it is present in the mandrill, and I have seen it in three specimens, one a young animal, and both the foramina large:

Of over a hundred species of new-world monkeys and marmosets I have seen thirteen specimens representing nine species, and did not find any foramina; neither do authors mention their presence.

It was absent from two specimens of *Indris*, from the ruffed and slow lemur. Blainville and Mivart found it in the slender lemur, and I have seen two specimens which showed it; in one the openings were very large. Mivart says it is sometimes present in the *awantibo*.

Passing to the Carnivora, Blainville says it is not present in the cats, about sixty-six species, except the pampas cat of South America. I have seen it in one ocelot on both sides, but in specimens representing eight other species it was absent. Blainville mentions its presence and I have seen it in some of the civets. A specimen of the aard-wolf showed it. Meckel and Arens say it is present in the hyenas, including the fossils. Blainville found it in the striped hyena, and I have also seen it. Filhol shows it in *Hyænodon*.

Blainville, Meckel, and Arens all speak of its constancy in the dog. All the species I have seen showed it, the only exceptions being an Eskimo-dog and a *Dachshund*.

Of seventeen out of nearly a hundred species of weasels the foramen was found, so far as I know, only in four—*tayra*, *Mellivora Capensis*, *Mydaus*, and American badger. It does not appear to have been seen in the raccoons or bears, nor in any of the aquatic Carnivora.

The Ungulata.—It is absent from the ox, sheep, goat, giraffe, and camel, and from the deer, except perhaps the roe, in which Arens has seen it; but the specimen I have seen did not show the foramen. I have found it in a specimen of the Javan chevrotain, but absent from two others. Generally speaking, therefore, we may say that it is absent from the deer. The prong-horned antelope affords a striking contrast. I found the opening in four out of five specimens. Out of over 200 species, therefore, of the section Pecora the foramen may be said to be present in but one.

In contrast with the Pecora the foramen is generally present in the Suina. All of seven specimens of the collared peccary showed it; one was a young animal; another had just matured. Arens says that the foramen is present in the whole family. Blainville found it in the wild hog and babiroussa, and Meckel in the common hog. Arens discredits the latter, and of about a dozen specimens which I have seen it was absent from all; most of these, however, were young. It may be that domestication has changed the habits of the hog. The opening has been seen in Pallas's wart-hog and the Liberian hippopotamus.

The Perrissodactyla afford some striking contrasts. The horse, rhinoceros, and elephant do not show it. It has been seen by Blainville in the daman. Blainville, Meckel, and Arens all found it in the American tapir. Of the six species I have seen four, the American, Malay, white-lipped, and Baird's tapir. Of eight specimens of the latter, sixteen humeri, there were three foramina on the right side, six on the left. Three of the specimens were young animals, in two of which the opening was absent; in one, absent on the left side.

Blainville and Cope mention its presence in some of the fossil Ungulata.

The Sirenia and Cetacea do not show it.

Out of more than 700 species of rodents the foramen was found in four of the squirrels; eighteen other species representing seven genera did not show it. It is absent from the beavers and gophers. It has been seen in three out of about 330 species of rats. The common rat and mouse do not show it. It has been seen in some of the octodons; in some of the agoutis, spotted cavy, guinea pig, and capybara. The large size of the opening in the Javan porcupine, golden agouti, guinea pig, and capybara is worthy of mention. All of the hares show the foramen.

It is probably constant in some of the Insectivora, as the tenrec and common hedgehog; I have also seen it in *Solenodon cubanus* and the South African hedgehog. Blainville found it in the *Tupaia* and he and Meckel in the flying lemurs. It was absent from the moles and shrews.

It is also absent from the bats and endentates, and probably the marsupials.

The olecranon perforation in the lower animals.

Chimpanzee, frequent.	Horse, absent.
Gorilla, frequent.	Rhinoceros, absent.
Orang-utan, frequent.	Elephant, absent.
Gibbon, rare.	Tapir, nearly constant.
	Fossil Ungulata, sometimes.
Colobinæ, absent.	
Cercopithecinae, occasional.	Sirenia, absent.
Mandrill, constant.	
New-world monkeys, absent.	Cetacea, absent.
Slender lemur, constant.	
Cats, absent.	Squirrels, rare.
Civets, common.	Beavers, absent.
Hyenas, constant.	Gophers, absent.
Dogs, constant.	Rats, rare.
Weasels, occasional.	Octodons, common in some.
Raccoons, absent.	Hares, constant.
Bears, absent.	
Aquatic carnivora, absent.	Tenrec, constant.
	Hedgehog, constant.
Ox, absent.	Moles, absent.
Sheep, absent.	Shrews, absent.
Goat, absent.	
Giraffe, absent.	Bats, absent.
Camel, absent,	
Deer, absent.	Edentates, absent.
Prong-horned antelope, constant.	
Peccary, constant.	Marsupials, absent.
Wild hog, present.	
Domestic hog, absent.	Monotremes, absent.
Hippopotamus, present.	

Several authors (1, 16, 27, and 28) have mentioned the occurrence of the opening in the lower animals. Mivart (42), p. 310, says: "The coronoid fossa is generally shallower in the Lemuroidea than in the Anthropeidea. A perforation extends into the olecranal fossa in some. This is very large and constant in *Loris*, but it is also present in *Troglodytes* and *Simia*, and sometimes in *Hylobates*, man, *Cercopithecus*, *Macacus*, and *Arctocebus*. The olecranal fossa is sometimes deep, as in the *Simiidae*, especially the *Cynopithecinae*. It is less so in man, and still less so in the lemuroids, especially in *Indris*."

Many works on human anatomy mention its occurrence in the human subject. (See 1 to 19, 22 to 27, and 42.) Meckel, 1825 (28), says that it is sometimes found in man, but is small; that the inferior races show it perhaps oftener than the superior. He found it especially in negroes and Papuans. Desmoulins, 1826 (29), mentions a Hottentot skeleton which showed the foramen, and refers to its being found in the Bushmen and Guanches, and states that in this respect they differ from the Mongols. He was in error as to the latter.

Dr. Jeffries Wyman (30), in 1853, examined at the *Jardin des Plantes*, Paris, the skeletons of seven full-blooded negroes; seven of the fourteen humeri, or 50 per cent., showed the foramen; in three subjects it existed on both sides; in one, only on one side.

In 1862 the Boston Society for Med. Improvement discussed the subject (30), and specimens from Indian mounds were shown. In 1863 the Anthropological Society of Paris took it up (31 to 37). Broca inaugurated the discussion, which recurred at intervals till 1881. Broca, Pruner-Bey, and Lagneau were the most prominent speakers. Perforated bones were shown from different parts of Europe: as the caverns of Montmaigre; sepulchre of Chelles; excavations of Chamont (stone age) and St. Etienne; Furfoz (reindeer age); caverns of Ariège; a Parisian cemetery of the XVIIth century; cavern of Frontal, Belgium; from the Ardèche; Vaureal, and Charreouy (polished stone). Pruner-Bey believed that the foramen was found only in women, because all the perforated humeri that he saw were small.

Verneau, 1878 (36), stated, in regard to the Guanches of the Canary Islands, that the humeri were robust, twisted, and often perforated; that the frequency of the foramen surpassed any previously known. In one grotto he found sixty-nine perforated humeri out of 150, or 46 per cent.; in other grottoes, a less per cent., but still high; and sometimes the foramen was of uncommon size. He did not find the anomaly among the present people of the islands.

Thulié, 1881 (37), stated that in the Bochimans the humeri were small and slender and the olecranon cavity perforated like the Guanches, some Egyptians, and many prehistoric humeri.

The subject was also discussed by the International Congress of Anthropologists, Paris, 1867 (38). Broca claimed that it had no connection with the rank a people held in the scale of races, and that the foramen constantly became rarer since prehistoric times. During the discussion it was stated that the opening had been seen

in the humeri of natives of Peru, Bolivia, and Mexico, and also in the Kalmucs.

The following is a list of collections, numbering sixteen humeri and upwards and arranged in the order of highest percentage of foramina:

No. of humeri.	No. of foramina.	Per cent.	Authority.	
89	48	54	A. M. M. col.	Prehistoric Arizona Indians.
150	69	46	Bull. Anthropol. Soc. .	Guanches, Canary islands. (Verneau.)
30	-----	36.2	Topinard -----	Yellow and American races.
32	-----	34.3	" -----	Polynesians.
80	-----	31.2	" -----	Indian mounds of U. S. Wyman, Peabody Museum.
20	6	30	The author.	Private collection, mainly negro and mulatto.
62	17	28	A. M. M. col.	Indian mounds, U. S.
67	18	28	Pruner-Bey -----	From Vaureal, France.
122	-----	25.6	Topinard -----	Guanches of Canary islands.
156	-----	21.8	" -----	Dolmens and grottoes around Paris. Polished stone.
97	-----	21.7	" -----	African negroes.
61	12	20	A. M. M. col.	Prehistoric Indians, ancient cities New Mexico.
28	-----	14.1	Topinard -----	Melanesians.
30	-----	12.1	" -----	Dolmens. De Quiberon.
66	-----	10.6	" -----	Caverns of l'homme mort, Lozere. Polished stone.
388	-----	10.6	" -----	Dolmens, Lozere. Polished stone.
288	22	7.5	A. M. M. col.	Mostly white soldiers.
27	2	7	Anthropol. Soc., Paris	Bulletins. From Chamont, stone age.
16	1	6	A. M. M. col.	Negroes and mulattoes.
200	-----	5.5	Topinard -----	Parisians from IVth to XIIth centuries.
96	5	5	A. M. M. col.	Cotemporary Indians.
150	-----	4.6	Topinard -----	Parisians of Cemetery of Innocents. (Hamy and Sauvages.)
* 218	-----	4.1	" -----	Parisians of Middle Ages. (Broca and Bataillard.)
52	-----	3.8	" -----	Europeans of America. Wyman, Peabody Museum.
* 218	7	3.2	Bull. Anthropol. Soc., Paris.	Paris cemetery of XVIIth century. Broca.
30	0	0	Topinard -----	Long barrows of England, bronze age.

* Probably same collection.

Dr. Wyman, in the Peabody reports of 1868-'78 (39), states that out of eighty humeri from the mounds of the western states and Florida twenty-five, or 31 per cent., were perforated; fifty-two

humeri of Europeans examined by comparison gave only two cases, or 3.9 per cent.

Dr. Montané, 1876 (40), presented six specimens of the foramen found in the island of Cuba to the Havana Academy, and said they were of the Chinese race.

To sum up the foregoing: Meckel mentions its frequency in the Papuan; Meckel and Wyman in the negro, and I am inclined to agree with them, although Broca, Lagreay, and Pruner-Bey doubt it; Broca, Pruner-Bey, and Desmoulins in the Hottentot; Desmoulins and Thulié in the Bushmen; Pruner-Bey and Thulié, its occurrence in the Egyptians; Broca, Desmoulins, Lagneau, Thulié, and Pruner-Bey all put the proportion high in the Guanches, and Verneau says it is not found in the present race of the islands.



Fig. 1.

The accompanying figure 1, natural size, is of the lower part of a left humerus, from the Salado Valley (Hemenway) collection; it

was made by Dr. J. C. McConnell, of the Army Medical Museum. The foramen is quite large, as are most of those in this collection.

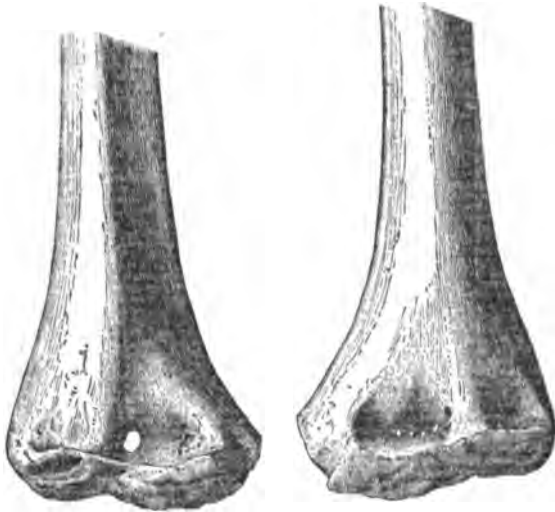


Fig. 2.

Figure 2 is also by Dr. McC. and of natural size. It represents the humeri of a child about eleven years old, from the same collection. The right humerus shows a small foramen, with sloping edges. The left shows a wider, flatter, and thinner partition, with several small openings. It looks to me as if these foramina were just in process of formation, with the promise of the left being the larger. I was at first inclined to think with De Blainville and Meckel that the foramen was due to a want of ossification; but if I interpret these specimens correctly it is formed at least sometimes and probably always, not by a failure to ossify, but by a process of atrophy after ossification has taken place. It will be observed that the fossæ and foramina are above the line of epiphyseal junction.

The fact that in the collection of tapirs above mentioned the young did not show the foramen while the mature animals did seems to favor my proposition that atrophy occurs as maturity approaches. If this be correct, then the atrophy itself would seem to be caused by the pressure of the coronoid or olecranon process, presumably the latter, as shown, for instance, in the dog, where in the dry bone the olecranon process projects even through the foramen.

Dr. Harrison Allen, of Philadelphia, wrote a commentary on this paper as it was originally prepared and before some important observations had been made. I insert here so much of his remarks as will apply to it in its present shape. He says:

"Reviewing the list in which the olecranon perforation is absent, it is seen that it includes all swimming and flying forms, as instanced in Sirenia, Cheiroptera, and Pinnepedia. In terrestrial types, which are adapted to life in the water, such as the aquatic carnivora, it is also absent. Such facts suggest the conclusion that the relief of the limb from impact is in some way associated with the absence of the foramen. In like manner the absence of the foramen in the Edentata is evidence in the same direction, since these creatures are either fossorial or arboreal, and in neither adaptation is any result of impact demonstrable in the limb. If, therefore, it be conceded that the foramen is absent as the result of withholding of co-ordinated lines of pressure which accompany progression upon the ground, it becomes interesting to contrast the humeri of the old and the new world monkeys. In those of the old-world group the foramen is present, since progression (except in *Hylobates*) is much the same as in other terrestrial mammals; whereas in those of the new world the prehensile tail must remove much of the impact from the limb.

"Again, even among the terrestrial carnivora the impact is much less (owing to the spread of the toes in the act of supporting the body) in Felidæ, Procyonidæ, and Ursidæ than in Canidæ. Why it is absent in some of the Ungulata and present in others is inexplicable by any such hypothesis. It appears to be variable in limbs of the same species as in the ourang and to be present in wild forms yet variable in domesticated forms of *sus scrofa*. In man the greater frequency of its presence on one side of the body is curious, for according to the law of impact it should be absent on both.

"In conclusion, I may say that the theory of impact appears to account for the presence of the foramen in some of the most highly differentiated forms, but that its significance is evidently complex and will not admit of a single explanation.

"In domesticated animals, including man, I am convinced that variations are always of obscure significance. The effects of diseased action often disturb the evolution of characters, and the observer must be on his guard how far to rely on general biological tenets in his attempts to explain variable structures."

Dr. J. I. Wortman, anatomist of the Army Medical Museum, has written the following opinion :

"The explanation of the presence or absence of the olecranon perforation in the mammalian humerus is not altogether an easy matter when we take into consideration the diverse and widely separated forms in which it occurs ; still there can be little doubt that in some species at least, in which it is very constantly present, the simple mechanical explanation appears to be the only reasonable one that can be offered.

"An example of this kind is afforded by the dog and hyena, among the terrestrial carnivora. In them it will be noticed that the perforation or foramen is always large, and that the olecranon fossa is remarkable for its depth ; that in extreme extension of the forearm the olecranon process of the ulna fits accurately into the foramen, thereby allowing the limb to assume nearly a straight line, which it could not otherwise do if no foramen were present. In the cat, on the other hand, in which the foramen is invariably absent, so far as my knowledge goes, the limb cannot be brought so nearly into a straight line by extreme extension of the forearm, for the reason that the olecranon process of the ulna impinges upon the bony septum between the coronoid and olecranon fossæ of the humerus.

"How, now, will we explain the difference in structure upon any hypothesis regarding the use of the limb ? It is a fact to be constantly observed in the habits of these animals that the dog and hyena, in feeding, place both forelimbs upon the bone or other morsel and remove pieces by tearing or pulling them off with the mouth. Again, who has not noticed the delight of the puppy at play in taking hold of an object with his mouth and pulling ? Both of these acts require that the forelimbs, in order to form an efficient brace, must be made to assume as nearly a straight line as possible, so that the strain may fall directly upon the bones and not depend upon the strength of the triceps muscle, which would prove a manifest disadvantage. A constant repetition of this posture and a constant effort upon the part of the animal to straighten out its forelimbs has caused an encroachment of the olecranon process upon the bony septum between the olecranon and coronoid fossæ, resulting, finally, in its disappearance and the formation of the foramen.

"In no other species of the carnivora, with the possible exception

of the civets, do we observe similar habits or a similar use made of the forelimb; and in none of the rest of them do we find the foramen present. It may therefore be reasonably concluded, I believe, that in so far at least as these animals are concerned the mechanical hypothesis affords an explanation.

"As regards the presence of the perforation in other forms, Dr. Allen has already suggested a plausible reason for its absence in the Cebidæ and its frequent occurrence in the Simiidæ among the primates. Among the Rodentia it appears to be principally developed in the Lagomorphs or rabbits and the Hystricomorphs or porcupines and their allies, although some few of both the squirrel and rat divisions show it. I am not familiar with the habits of these animals; but it is possible that some peculiar movement of the forelimb in obtaining their food may be responsible for its production in a manner not dissimilar to that already discussed in regard to the dog and hyena.

"Concerning the Ungulates, its presence in such forms as the prong-horned antelope, the pig, peccary, tapir, and, possibly, a few others, would appear at first sight to be puzzling; but when we recall the habits of some of these species we are not so much at a loss for an explanation.

"The pig and peccary have a habit, similar to that of the dog, of using their forelimbs to hold their food firmly to the ground, if it is of so firm a nature as to require forcible tearing apart. The same conditions would prevail, therefore, as in the dog, and as a result the foramen appears. This explanation will not apply to the prong-horned antelope in so far as the particular use of the limb is concerned. In them I fancy the perforation appears by reason of their peculiarly stiff-legged way of running, if I may so call it. This is so marked that the practised eye of the hunter seldom fails to distinguish the peculiar gait of the animals even at a great distance, as I have so frequently observed. The effect is again the same in this case, namely, straightening the limb and the consequent pushing through of the olecranon process of the ulna.

"In the case of the tapir I am not sufficiently acquainted with the habits of the animal in its native haunts to offer any explanation, but it would not be at all surprising if it is found that he uses his forelimb after the manner of the pig in tearing up succulent roots and other materials upon which he feeds."

I have no further explanation of my own to offer and would

rather submit the case in its present shape. The historical research seems to confirm the testimony of the osteological collections, that the foramen was most frequent among the ancient peoples. The relative habits will probably explain the difference.

The greater frequency on the left side is still an enigma. I have noticed that generally where it was present on both sides the left was usually the larger; where absent on both sides the left partition was usually thinner.

I desire to thank Dr. J. L. Wortman, anatomist of the Army Medical Museum, and Mr. Fred. Lucas, of the U. S. National Museum, for assistance in preparing this paper.

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The above paper was read before the Society February 15, 1890. In the discussion which followed, Dr. MATTHEWS said that as the olecranon perforation was, in all probability, due to repeated and

forcible extension of the forearm, we must look for its cause in some labor which required its extension. Among the agricultural aborigines of the Southwest, who showed high percentages of this formation, we need not go far to discover the existence of such labor. The females were engaged during the greater part of their time in grinding corn; this was performed on a *metate*, or large flat stone, by means of a smaller stone, which was held in both hands of the operator and moved forward and backward. The chief exertion was made in moving the stone forward and required the most forcible extension of the forearm. Some agricultural tribes of the North used wooden mortars and pestles, which required a different motion in working them.

Professor COPE remarked that the orifice in the humerus discussed by Dr. Lamb could be called neither a foramen nor a fontanelle, but is simply a perforation dependent on the thickness of the lamina which separates the anterior and posterior fossae of the humerus. It is not useful for systematic purposes, as its presence rarely coincides with the rest of the structure. It indicates a deficiency of bone structure at the locality in question, but he was unable to assign any definite cause for this condition. The presence of the perforation is certainly not due in some cases to continued extension of the fore-arms; since in many aquatic mammals, as the seals, where vigorous extension is necessary to the use of the limb in swimming, the foramen does not occur. Within a limited range the character might be useful for diagnostic purposes, as for instance, as an aid in discriminating certain races of mankind.

POLYNESIAN LANGUAGE.—René Allair (in *Revue Géographique Internationale* for December, 1889, p. 266) characterizes the language of Polynesia as follows:

“The language is soft; it is as clear and well defined as French, simple as English, but less unpleasant in pronunciation; poetical as German, but less complicated; rich as Russian, but less difficult. It abounds in vowels like Japanese and Italian; it is as noble as Spanish.”

JOHN MURDOCH.

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BOOK NOTICES.

British Association for the advancement of Science. Fifth Report of the Committee appointed for the purpose of investigating and publishing Reports on the Physical Characters, Languages and Industrial and Social Condition of the North-Western tribes of the Dominion of Canada. London, 1889.

As stated by Mr. Hale in his preface to the above report, British Columbia offers to the present student of anthropology the best field for original research in North America. To a considerable extent this is due to the fact that the tribes, especially of the interior, have suffered comparatively little from contact with civilization and yet retain in pristine simplicity many of their old customs and beliefs.

The effort, therefore made by the Canadian Government, conjointly with the British Association for the Advancement of Science, to harvest the material from this comparatively unworked field must interest all students of anthropology.

That the selection of Dr. Boas for this important work, because of his experience and training, was a wise one, is fully substantiated by this, his first general report.

Though the trip undertaken in 1886-87 and that of the following year were in the nature of reconnaissances, a considerable body of important facts was gleaned, an earnest of the full harvest which awaits more extended observation.

In this connection it may not be amiss to call attention to the fact that the demands of the science of to-day can only be met by the student who is able not only to visit but to live among the people he would investigate, and the more closely he conforms to the habits and life of the tribe and the more completely he is adopted by them, the fuller and more accurate will be his returns. No one better understands the situation than Dr. Boas, and in his comments upon the necessarily fragmentary character of his results he states that "the difficulty of observing or even acquiring information on such points [social organization, customs, arts, and knowledge] during a flying visit of a fortnight—the maximum time

spent among any single tribe—is so overwhelming that no thorough report is possible, and it is almost impossible to guard against serious errors.”

Unfortunately the students as yet are few who, like Dr. Boas, are willing to decivilize themselves, and to be Indians among the Indians. Yet it is certain that until the men and means are found to do the work in this way, the results reached will continue to be fragmentary and more or less permeated with error. The stranger, however well acquainted with Indian nature and however tactful, must remain a stranger in a tribe for a long time, for Indian suspicion and reserve are hard to penetrate. The missionary who knows an Indian language, and no missionary can succeed who does not, has so far an advantage, but as his teachings are largely directed against Indian customs and beliefs, and his position is thus antagonistic, he too can, as a rule, reach but a limited distance into the mysteries of Indian sociology, mythology, etc. It is only the trained student who is willing to sever himself from civilization who can reap a full measure of success.

Space permits mention of only a few of the important details of Dr. Boas' paper. The country visited is occupied by tribes belonging to no fewer than seven or eight distinct linguistic stocks—a statement which at once conveys an idea of the difficulties of the student.

These, as given by the author, are:

1. Tlingit of Southern Alaska ; 2. Haida of Queen Charlotte Islands and part of Prince of Wales Archipelago ; 3. Tsimshian of Nass and Skeena Rivers ; 4. Kwakiutl of the coast from Gardiner Channel to Cape Mudge, except the country around Dean Inlet and the west coast of Vancouver Island ; 5. Nootka of west coast of Vancouver Island ; 6. Salish of the coast and the eastern part of Vancouver Island south of Cape Mudge, the southern part of the interior as far as the coast of the Selkirk Range, and the northern parts of Washington, Idaho, and Montana ; 7. Kutenai of the valley of upper Columbia, Kootenay Lake and River, and adjacent United States.

Dr. Boas points out that the language of two of these families, the Haida and Thlinkit, contain many similarities of form and phonetic elements, and that at least they form one group both by reason of their similarity to each other and their dissimilarity from the other families. He, nevertheless, notes a great difference be-

tween their respective vocabularies and grammatic elements and hence treats them as distinct, though considering the question of this relationship yet an open one.

The Indians of the coast without regard to family are naturally fishermen as are also, chiefly, the interior Salish and Cootenai. Most of the interior Indians have given up their ancient customs and are Roman Catholics. They are said to be good stock raisers and to endeavor to irrigate their lands, but to be poor. The Coast Indians are well off.

The Tsimshian have been Christianized, as is well known, and have given up nearly all their own customs.

The physical character of the coast tribes is said to be very uniform. This would seem to have resulted from similarity of habits and general environment rather than from the "frequent intermarriages" as stated by the author, though this too, doubtless, contributes to the general result. He finds further that the habitus of the northern tribes—Tlingit, Haida, Tsimshian, Kwakiutl, and Bilqula, and to a less extent of the Nootka—is similar to the East Asiatic tribes. The coast and interior Salish are of a different type. "As the Bilqula speak a language belonging to the Salish family, it must be assumed that they acquired this distinct physical character through intermixture with the neighboring tribes."

Labretifery prevails among the females of the Tlingit, Haida, Tsimshian, and Heiltsuk, in short among the northern tribes of the region, from whom, probably, the custom was borrowed by the Alaska Eskimo.

Chiefs' daughters among the Tsimshian are said to grind down the incisors to the gums by chewing a jade pebble, thus forming an arch—a curious sign of royalty indeed!

Dr. Boas is of the opinion that the mental capacity of the Indians described is high. He thus sums up their chief traits:

"He is rash in his anger, but does not easily lose control over his actions. He sits down or lies down sullenly for days without partaking of food, and when he rises his first thought is, not how to take revenge, but to show that he is superior to his adversary. A great pride and vanity, combined with the most susceptible jealousy, characterize all actions of the Indian. He watches that he may receive his proper share of honor at festivals; he cannot endure to be ridiculed for even the slightest mistake; he carefully guards all his actions, and looks for due honor to be paid to him by friends,

strangers, and subordinates. This peculiarity appears most clearly in great festivals, which are themselves an outcome of the vanity of the natives, and of their love of displaying their power and wealth. To be strong, and able to sustain the pangs of hunger, is evidently considered worthy of praise by the Indian; but foremost of all is wealth.

"It is considered the duty of every man to have pity upon the poor and hungry. Women are honoured for their chastity and for being true to their husbands; children, for taking care of their parents; men, for skill and daring in hunting, and for bravery in war."

A very important subject for investigation among our Indian tribes is the nature of property ownership, especially of land. It is generally believed that tribal ownership in land was the universal rule among eastern tribes. Not so among the coast tribes of British Columbia. Mr. Dawson states of the Haida (Queen Charlotte Islands, 1880, 117, 118) that the coast line and berry fields belong to the different individual families by whom they are considered as personal property and as hereditary.

Dr. Boas, however, assigns to the gentes the property rights which Dawson gives to individual families. The former says, p. 37:

"Among all the tribes heretofore described, each gens owns a certain district and certain fishing privileges. Among the Tlingit, Haida, and Tsimshian, each gens in each village has its own fishing-ground; its mountains and valleys, on which it has the sole right of hunting and picking berries; its rivers in which to fish salmon, and its house-sites. For this reason the houses of one gens are always grouped together. * * * The right of a gens to the place where it originated cannot be destroyed. It may acquire by war or by other events territory originally belonging to foreign tribes, and leave its home to be taken up by others; the right of fishing, hunting, and gathering berries in their old home is rigidly maintained. A careful study shows that nowhere the tribe as a body politic owns a district, but that each gens has its proper hunting and fishing-grounds, upon which neither members of other tribes nor of other gentes must intrude except by special permission."

But more curiously still "the property of the whole gens is vested in the chief, who considers the salmon rivers, berry patches, and coast strips in which the gens has the sole right, as his property." The chief thus appears to be a sort of executive officer and administrator to the gens.

Many important facts are given respecting the food, occupations, clothing, implements, houses, social organizations, government and law, birth, marriage and death customs, religion, shamanism, secret societies, and finally languages of the natives of this part of America. It is to be hoped that the investigations thus auspiciously begun may be continued indefinitely to the honor of the Canadian Government and the profit of scholars everywhere.

H. W. HENSHAW.

*Les Premières Populations de L'Europe, par le M^e de Nadaillac.
Paris, 1889.*

This work is in continuation of that by the same author, *L'Origine et le développement de la vie sur le globe*, published in 1885, which was intended to describe the succession of beings that have filled earth and sea "before the appearance of man at the moment prescribed by the divine will." The author now treats of man, his races, peoples, and advances, but in the present volume confines himself to the man of Europe, presenting, however, illustrations and parallels from all other parts of the world.

The treatise is in many respects excellent. In particular the brief but comprehensive account of the megalithic monuments may be mentioned, and perhaps no better summary of existing knowledge relating to the palafittes has been presented. The theory of the population of the earth by migrations from the arctic circle is disposed of with convincing force. The discussion concerning the priscan home of the Aryans is both fair and acute, the author's deductions being in favor of Bactria as a locus of dispersion. On the whole, the valuable portions of the work are too many for special notice in the space now allowed, which must be reserved for mention of some points requiring examination on account of their exposure to adverse criticism.

Undue weight is given in this treatise, as in most others on the general subject, to the objects found in connection with buried human remains as affording evidence of a synchronous prevalent belief in a future life. Undoubtedly, most tribes of men have held such a belief, more or less vague, at a certain stage of their culture; and then objects were buried with the dead which, in some undefined way, were supposed to be useful in the future state. But there was once a widespread custom of disposing of certain kinds of personal

property with the corpse, sometimes by burial, but also by cremation, in which the motive was sociologic and not religious. The object was to destroy the articles so as to preserve peace among the survivors. In a certain stage of savagery a man could have no property whatever, all property belonging to his clan. The first modification of this condition was in the allowance of personal ownership in weapons, tools, or ornaments of a man's own manufacture. On his death these objects did not belong to any one by title and, if not removed, they would become the occasion of contention, so they were destroyed, the act producing in time a burial rite. It is also to be considered that even at the present day the most cultured people bury with the corpses of their relations and friends such objects as were especially associated with the deceased in life. This is through a personal sentiment, and is certainly not a religious sentiment, though it may be connected with religion through heredity. An officer of the army is sometimes now buried in his uniform and with his sword, and his wife is buried in her last ball costume and jewels, but these practices do not imply the supposed use of those adjuncts in a future life, though they possibly are rooted in superstition changed in its expression. As we clearly know other motives than those connected with any religious dogmas for the burial, together with human remains, of such objects as are brought in evidence by the Marquis de Nadaillac and others of his school, the religious inferences derived from such burials are by no means conclusive. They may be suggestive and, in connection with other facts, may be highly instructive, but by themselves, as they are and must be in the older instances, they do not prove what is claimed for them.

The most serious error of the author is in the doctrines promulgated about the several distinct qualities and missions of what he assumes to be the distinct races of men. His commencing and concluding pages clearly set forth certain opinions as of ruling import, and fatalism is his watchword. He does not believe that there have been planes of culture common to all men from the earliest periods known, the characteristics of which planes were modified chiefly by specific environment. He regards the several races which he catalogues as specifically adapted by idiosyncrasy or predestination to certain planes and as limited to stages of advance beyond which, to them, death bars further progress, not even absorption being allowed.

There can be no doubt that death bars advance if the people who might, could, or should have advanced are exterminated by foreign invasion, and doubtless absorption is prevented when, *e. g.*, the Jews and the Goim, neither people will marry with the other; but such cases are exceptional in the grand history of man. The examples cited by the author are not fortunate. The most conclusive to him is the alleged fact that the North American Indian never has been and never can be civilized. That is the old *feræ naturæ* doctrine, now utterly disproved. It would seem that the Marquis had not read much of the literature of the last twenty years on this topic.

The last half of the author's last page, which gives his fundamental summations, presents some inconsistencies occasioned by the importation of what may be called the Calvinistic doctrine of predestination and election into the domain of anthropology. He says: "History shows on every page great peoples—the Egyptians, the Chinese, the Mexicans, the Peruvians—stopping in their start as if an impassable barrier had been planted before them. Arriving at the limit fixed by impenetrable decrees, they are not only incapable of progress but even of comprehending the power and necessity of progress." History might have something to explain about these peoples quite distinct from racial characteristics. This assertion is followed by the statement that "progress comes from the infusion of foreign blood among the old autochthonous populations," and that "the races of Europe, which were and are reserved for the highest destinies, owe their grandeur and incessant progress to the Asiatic invasions." Thus racial characteristics and racial predestination are of much higher import than environments, yet progress was gained by the amalgamation of races, not by their continued purity. All races that became amalgamated in Europe were good as ingredients; all others were bad. It is to be inferred that the "autochthonous races" of Europe and of Asia were both bad, but that a primordial decree allowed of their favorable amalgamation with excellent results. So it would seem that if some other races had been allowed to amalgamate the result might also have been good. But the decree was against this union. There is no consideration of the fact that causes are known to be in continuous operation by which, the world not yet being at its end, there may be further amalgamation of peoples that are still in different stages of advance. It would be difficult to propose any explanation of man's progress less

scientific or more egotistic than this theorized monopoly of preordination. It recalls the Puritan pronunciamiento: *Resolved*, 1st, that the earth belongs to the saints; *Resolved*, 2d, that we are the saints.

GARRICK MALLERY.

Myths and Folk-lore of Ireland. By Jeremiah Curtin. Boston. Little, Brown & Co. 1890. Cloth, 12 mo, vi, 345.

Such is the title of an attractive volume which comes to us in an appropriate binding of green and gold, with a spray of shamrocks in the corner. The author (an American by birth, but Irish by remote ancestry, as the name indicates) is probably as well qualified for the task he has undertaken as any man living, being a professional linguist and mythologist who has spent many years investigating the languages, customs, and traditions of the primitive people of three continents, from the root-eating tribes of California to the warlike mountaineers of the Caucasus. The twenty myths here given are part of the material collected in the district of the west of Ireland where Gaelic is still the everyday language of the people. Most of the stories were gathered through interpreters from the lips of old men and women to whom English is a foreign tongue, and most of whom have never been farther from home than the nearest market town or the bounds of the next parish. The result is a collection of Keltic heroic legends almost entirely free from the foreign corruptions due to the intrusive race.

In the introduction, the author treats of the nature and origin of myths. He dismisses as partial, and therefore incorrect, the theories of Müller and Spencer, who derive all mythology from a misconception of the meanings of words and a confusion of ideas, and asserts, what is probably the true theory, that it has its origin rather in a misconception of the causes of phenomena, or, as Mr. Curtin puts it: "The personages of any given body of myths are such manifestations of force in the world around them, or the result of such manifestation, as the ancient myth-makers observed."

The definiteness of detail characteristic of Irish stories contrasts strongly with what is found in other parts of Europe. In Hungary, for instance, the usual introduction is, "There was in the world," while the Russian story teller, hardly more satisfactory, informs us that "in a certain state in a certain kingdom, there was a man."

"In the Irish myths," on the contrary, "we are told who the characters are, what their condition of life is, and where they lived and acted; the heroes and their fields of action are brought before us with as much definiteness as if they were persons of to-day or yesterday," and in another place he asserts that "the Gaelic mythology, so far as it is preserved in Ireland, is better preserved than the mythology of any other European country." From the definite character of the myths, together with the internal evidence afforded by the language itself, it would seem that the Gaelic occupancy of Ireland dates from a very remote antiquity, going back, in fact, to the period of the earliest wave of migration from the primitive home of the Aryans.

The most interesting legends of the volume are those belonging to the great epic cycle of the *Féinne*—the *Nibelungenlied* or *Kalevala* of the Gael. The *Féinne* were the knightly champions of ancient Ireland, banded together under the leadership of Fionn MacCumhail, from whom they derived their name. The story of their origin is curious. The beautiful daughter of a king is to be won only by the performance of a feat which all the princes and heroes of Ireland had attempted in vain, and in consequence of failure they have been confined in a dungeon and condemned to a cruel death. Fionn, a youth until now unknown to the world, performs the task and rescues the heroes, who agree to follow him and obey his every command. Thus originated the *Féinne Éirinn*. Fionn himself is the offspring of a secret union between Cumhal and a king's daughter, and has been brought up in concealment by his grandmother to escape the wrath of the king, to whom it had been foretold by the druids that he would one day lose his kingdom at the hand of his grandson. In all his adventures he is accompanied by a group of chosen companions, each one of whom is endowed with some magic gift, and by a wonderful dog, Bran, born on the same day as her master. The champion himself obtains knowledge of whatever is going on in any part of the world by chewing his thumb, which had once touched the Salmon of Knowledge. One of these legends, that of the death of Cuchullin, resembles the pathetic story of Sohrab and Rustem in the *Shahnameh*. The cycle properly ends about the beginning of the Christian era, but is brought down to a later date by the re-appearance of Oisín (the Ossian of Macpherson), who returns from the Land of Youth, after an enchanted existence of three hundred years, in time to be baptized by Saint Patrick, soon

after which he dies. The legends are common to the Gaelic population of both Ireland and Scotland, and in the former country, especially, some one of the leading incidents is localized in almost every county. The modern Fenians derive their name from these old mythic champions.

Not alone the Fenian stories, but also all of the others which can be considered distinctively Gaelic, are found in almost identically the same form in the highlands of Scotland, as was discovered by Campbell, who published a valuable collection of "Popular Tales of the West Highlands" nearly thirty years ago. For instance, in the Irish story of "The King of Erin and the Queen of the Lonesome Island," the false queen is made to put on a magic belt, which tightens and compels her to confess that her children are not the king's sons. In the version noted by Campbell "Conall, at the end, puts a ring on the queen's finger. It tightens and forces her to confess that her sons are not the king's children, and Conall reigns as the king's only son." The Green Isle of Campbell may be the Lonesome Island of our author, from a confusion of two similar words, *uaine* (green) and *uaigneach* (lonesome). The incident of the hero and the sleeping queen occurs also in a Norse tale in Dasents' collection. "Fair, Brown and Trembling" is another form of the story better known as "Cinderella." The version here given, although obtained in the Gaelic district of the west, has evidently suffered at the hands of the modern story teller, who makes the king's son go to mass and wait outside the church door for the maiden, who is afterward shut up in a closet by her envious sisters to conceal her from his sight. In the Leinster version, as learned by the writer years ago at his mother's knee, the girl goes to a grand ball at the king's palace and is afterward hidden under a large basket (*clíabh*), when the little bird hops in at the door and begins to sing,

"Bonny foot and hilly foot,
In under the basket."

The author is to be commended for studiously avoiding that abominable mixture of jargon and cheap vulgarisms popularly supposed to represent the Irish brogue, while at the same time he has carefully preserved the strong Gaelic idioms which give so much force and beauty to the language, as exemplified in the proverb of the people, "Plead for your life in Irish." It must be remembered that English is a foreign tongue which has been forced upon the

people of Ireland, chiefly within the present century, and the broken forms of the Irish peasant no more represent his correct modes of expression in his own language than the coarse slang and dialect phrases of the Georgia cracker or the western cowboy represent the language of Americans. The only effect of such a misuse of words must be to disgust sensible people and represent an intelligent nation as a set of buffoons.

It is to be regretted that more space is not given to explanatory notes and to comparisons with the mythology of other European countries, but this may be remedied in a future edition. Taken altogether the book is the best of the kind that has appeared since Kennedy's collection was published twenty-five years ago, and is the first real attempt to bring to popular notice the splendid legendary treasures of the oldest nation of Western Europe.

JAMES MOONEY.

Report of the Cruise of the Revenue Marine Steamer Corwin in the Arctic Ocean in the year 1884. By Capt. M. A. Healy, U. S. R. M., Commander. Washington, 1889.

The recently issued report by Capt. M. A. Healy upon the cruise of the *Corwin* in the Arctic, in 1884, possesses more than usual claims upon the attention of those who are interested in the natives of Northwestern Alaska. It is nearly three years since the companion report of 1885 was issued, and the two together supply many valuable details regarding the little known natives of the interior of Northwest Alaska. The report for 1884, though issued subsequently to that of 1885, is much more satisfactory to the student of anthropology.

The report of the commanding officer contains, in addition to the matter descriptive of the country and the cruise, some interesting statements in regard to the Eskimo. The injustice of the law which prohibits the sale of breech-loading rifles to the Eskimo is pointed out, and its repeal advocated on the ground of reason and humanity.

The efforts of the *Corwin* have resulted, it is said, in the almost complete suppression of the whiskey traffic with many of its attendant evils; but it is evident, from other statements in the book, that the good work is by no means finished.

As a result of fifteen years' observation, Captain Healy places the native population of Alaska at about 20,000. It is, however, to the narrative of the exploration of the Kowak River by Lieut. J. C. Cantwell that the student will turn with greatest interest. Though the primary purpose of the journey was exploration and not scientific investigation, and although no professed ethnologist accompanied the party, yet many important facts regarding the natives were obtained and recorded.

The interior of Northwest Alaska is composed of broken, irregular mountain ranges with wide stretches of tundra or sphagnum plains. Small streams of water intersect the tundra in every direction which have their origin in innumerable lakes. In such a country a boat is an absolute necessity for summer travel.

The inhabitants of the river are Eskimo, but they are Eskimo of the interior, and the change of habitat has resulted in a corresponding change of habits and apparently even of physical characteristics. Thus we are told that they have, as a rule, dark complexions, prominent cheek-bones, large mouths, and sharp chins, giving to the face a triangular appearance very different from the round face of the coast Eskimo.

An estimate of the population of the Eskimo of the Nöitoc, Kowak, and Selawick rivers, whose language and customs are said to be practically identical, is as follows: Nöitoc, 350; Kowak, 275; Selawick, 300—total, 925.

From the middle of July to the latter part of August, the natives from the inland meet their brethren from Cape Prince of Wales, Diomedes, and Point Hope, on Hotham Inlet, for the purpose of trade, and their intercourse appears to be limited to this period.

Unlike the coast Eskimo, the Kowak natives do not live in permanent winter settlements. In early winter they gather in small, isolated communities, usually of from one to three families, and live in subterranean houses near the banks of the larger streams. Later, when deep snow has fallen and the surface is frozen hard enough for sledding, they begin a nomadic life. At this season the flesh of the reindeer furnishes the chief means of subsistence, and in the pursuit of these animals they are compelled to wander here and there over the vast plains of the interior. Having located a herd of reindeer, the young men are followed by the old men and the women and children, whose duty it is to bring up the camp equipage on dog-sleds. Notwithstanding the precarious character

of the food supply at this season, the natives are said to be as improvident as the North American Indian usually is wherever found, and they rarely have on hand more than two or three days' extra supply of provisions. As it not infrequently happens that stormy or very cold weather imprisons the hunters within doors for a week at a time, starvation is often threatened and occasionally whole families fall victims. It seems to be their usual custom to dry sufficient fish to last from the time the rivers are frozen until winter hunting begins; but with this exception the natives appear to make no effort to lay up a store of provisions in case of accident or unusual scarcity of game.

The cooking in winter is of the most primitive kind: A small wooden tub is filled with snow which melts in the heated air of the iglu; the water then made to boil by means of stones heated to redness in the flame of the stone lamp. The meat is then partially boiled.

When the ice in the river begins to break up and the returning sun has rendered the snow unfit for sledding, the natives gather in small settlements along the banks of the larger rivers and locate their summer houses. The men then have recourse to hunting and trapping, and the women prepare their nets for fishing, for, rather curiously, the labor of catching the fish is allotted to the women. The summer houses are very simple structures, being made by planting half a dozen pliant willow wands in the ground in the form of a circle, bending their upper ends and twisting them together to form the frame. A covering of deer skins or drilling makes the house complete.

Lieutenant Cantwell supplies the natives with a certificate of excellent character. They are honest in dealing with strangers and among themselves. They are simple, credulous, and hospitable, and though intensely curious, are not prying or intrusive. In their domestic relations they are kind to each other, and the universal consideration paid to the old is a marked trait of their character. He admits, however, that they are prone to the sin of lying, and when detected, they do not exhibit any shame whatever.

As appears to be the case among the Eskimo everywhere, there are no recognized chiefs or any trace of tribal union. The shamans are greatly respected among them, and those individuals more intelligent or more highly gifted naturally have much influence. As the women render important assistance in obtaining food

and as burden carriers, they, too, have considerable influence, and it is stated that "in all discussions touching the welfare of the community, or any important project, the women, especially the old ones, join, and their opinions are received with evident respect by the men."

They suffer most from pulmonary complaints and rheumatism. Epidemic diseases are of rare occurrence, and it is stated that syphilis has not reached the interior settlements to any great extent, but it is only a question of time when its ravages will extend from the coast tribes to this people. The treatment of the sick consists, as among our Indians, of shamanistic rites, the shaman using a few herbs to assist him in his incantations, nothing in the way of medicine for the disease being given to the patient.

Near the coast the ordinary Eskimo kyak is used, but towards the upper Kowak boats of spruce and birch bark were found, the former material being employed for the larger and more serviceable boats, while birch served for the lighter canoes that are stated to have been of the most exquisite design.

In the winter snow-shoes furnish the ordinary means of locomotion, while transportation is effected by means of dog-sleds.

Unlike the coast Eskimo of Alaska, the Kowak Eskimo do not, as a rule, wear labrets. Altogether these inland Eskimo form an interesting object for study, combining as they do, to a slight extent, the habits of the coast Eskimo with the general habits and, apparently, also, to some extent, the physical characteristics of the Athapascan or Tinne tribes of the far interior. They serve well to illustrate how completely the Eskimo is a creature of his environment, and the extent and readiness with which changes take place when he is subjected to different conditions of life.

It is greatly to be regretted that the author of this valuable report did not obtain vocabularies of the people he visited. The comparison of the dialects of these inland Eskimo with one another and with those of their coast brethren could scarcely fail to yield interesting and important results. The report is generously illustrated, and among the illustrations of the natives and their houses and products are some of the best that have yet appeared.

H. W. HENSHAW.

NOTES AND NEWS.

PREHISTORIC MAN IN AMERICA.

To the Editor of the American Anthropologist :

DEAR SIR: I agree so entirely with the sensible and conservative conclusions of Major Powell's article upon *Prehistoric Man in America*, in the Forum for this month, that I regret that any flaw may be detected in his arguments by "archæologists." As an anthropologist and geologist his reasoning will undoubtedly carry great weight, but I believe he makes no claim to be regarded as an archæologist; while he certainly has sufficiently indicated his opinion about "pseudo-archæologists." As my own published opinions coincide in almost every particular with his, I cannot be suspected of any other motive than to strengthen the case he undertakes to establish.

That the so-called "mound builders" were ancestors of the Indians I fully believe, but it is not the fact that "white traders" ever offered to the Indians "stone tomahawks and stone knives," as he states, or "a better class of copper tools," and that in consequence such objects have been "scattered through early barter far and wide over the land." Such a proceeding clearly would have been futile. The first traders wished to make the Indians more successful hunters in order that they might get more peltry from them, and to effect this provided them with steel tomahawks and steel knives in place of their own weapons made of stone or occasionally of copper. This is perfectly well known both by historical evidence and by archæological proof. All the "beautiful" stone and copper implements that have ever been discovered are of native fabric, with the exception of certain gross and palpable forgeries by which no properly-informed "archæologist" could be deceived for a moment.

In regard to the stone mortars, discovered in large quantities in the gold-bearing gravels of California, Major Powell states that they "are identical in every respect with those found in modern times," and he suggests that they may have been used by the Indians to grind acorns in. But this is entirely at variance with the statement

of Mr. Skertchly in an article "On the Occurrence of Stone Mortars in the Ancient (Pliocene?) River Gravels of Butte County, California," published in the *Journal of the Anthropological Institute of Great Britain and Ireland*, Vol. XVII, pp. 332-337 (Jan. 10, 1888). He says "This country was inhabited by the Digger Indians until about the year 1865. My friend, Mr. Glass [the superintendent of the Spring Valley Gold Mine], was well acquainted with them, and assures me that they did not use such mortars. They hollowed out rocks *in situ* and therein pounded the acorns on which they so largely subsisted. They were acquainted with these mortars, but knew nothing about the makers of them, and held them in such superstitious dread that on no account could they be induced to touch one."

Again, Major Powell does not discriminate sharply enough between "palæolithic implements," properly so-called, and those of a similar rude type, which were manufactured and used by the Indians at or about the time of the advent of the Europeans to these shores. I suppose he has in mind the error into which Mr. Wilson has fallen in his article in the *Anthropologist*, for July, 1889 (vol. II, p. 239), on *The Paleolithic Period in the District of Columbia*, that "the distinct type of implement called paleolithic is not known to have been used by the American Indian." I have taken too many of them with my own hands out of Indian "shell heaps" not to know the contrary. There is no difference in "type" between them, and the sole distinction lies in the circumstances under which they have been found. I wish Major Powell had made this clear, as he certainly believes in it.

It is greatly to be regretted that Major Powell should seem to question the genuineness of the carvings and drawings upon bone, ivory, or reindeer horn, which have been discovered in the cave-dwellings of the Dordogne, in Southern France. I am sure he would not have done so if he had ever seen any of the originals, and he must have been misled by poor engravings of them. For this reason I regret the more that I have not been able to find a purchaser in this country for the fine collection of them, made by the Vicomte Lastec St. Jal, from the celebrated cavern of Bruniquel. It would then be plain to see that "these unskilled savages could cut pictures on bone, and possessed the knowledge and skill needed to represent relief in form and relations in space," just as, it might be observed, the recent Eskimo have done. The more careful publications,

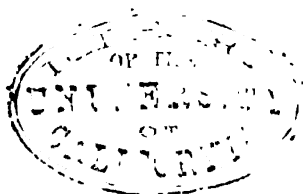
however, of the collections of MM. Massenat and Piette have given even those who have not had the advantage of personal inspection the ability to judge accurately about the genuineness of these most important contributions to the history of the artistic development of mankind.

HENRY W. HAYNES.

BOSTON, *January 4, 1890.*

ARCHÆOLOGIC DISCOVERY IN IDAHO.—In a recent address before the Brooklyn Institute Prof. S. Frederick Wright announced an archæologic discovery in Idaho, a short notice of which appeared in the *Scientific American* of November 9, 1889, and more recently in *Scribner's* for February, 1890. The account states that an artesian well was being bored at Nampa, Idaho, by Mr. M. A. Kurtz. The drill was used until the lava deposits were passed, when a sand pump was introduced, and at the depth of 320 feet a small figurette was brought up which is described as apparently the figure of a female, one arm and leg being missing. The image was first supposed to be of fine pumice stone, but, upon examination by Professors Putnam and Haynes, it appears to be made of stiff clay, with a coating of oxide of iron, which gives it a mottled appearance. The latter gentlemen are said to be well satisfied of the genuineness of the image and of the fact that it is of considerable antiquity. With reference to the all important question of the antiquity of the find, Prof. S. F. Emmons, of the U. S. Geological Survey, is of the opinion that the beds from which the image is said to have come are probably older than any deposits from which human implements have hitherto been derived. The beds in question were laid down prior to the lava flows which overlay it, and the depth of the cañon which the Snake river has cut in its present course through the lava is the time measure relied upon by Prof. Emmons. It is to be observed, however, that no detailed geological study of the region in question has yet been made, and, as Prof. Emmons himself states, such a study is absolutely necessary ere any reliable estimate of the age of the sand deposits can be made.

H. W. HENSHAW.



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CUSTOMS OF COURTESY.

BY GARRICK MALLERY.

Few ceremonial customs have originated in recent times. Their forms, whether now trivial or still important in Sociology, are vestiges of the past and only by anthropologic studies are traceable to their genesis and early form. All authorities, unswayed by a religious or theorizing bias, agree that in the origin of these ceremonies there was nothing designed or intentional—that is, they were not directly invented with definite purposes. A thing is not now and never has been customarily done because it is intrinsically right, but is considered to be right after and because it has been habitually done, whatever its origin or the circumstances in which it prevailed.

The rules of courteous behavior as they now exist are not the immediate effect of deliberate conventions, but are the natural and slow product of the forces gradually developing social life, and they exhibit the laws of evolution with as great distinctness as is demonstrated in the physical realm. Men have not fabricated though they have framed rules for themselves. They have fallen into the customs from which rules were framed, and then by unintended modifications have deviated into novelty and new rules.

Oriental philosophy regards our scientific studies as futile. With its watchwords on the one hand of Kismet, on the other of Nirvana, it pronounces as worthy of attention only those subjects which are relegated by the professed agnostic to the limbo of the unknowable, and by most believers in religious creeds to the nebula of the supernatural.

The classic Greek philosophy of the archaic is illustrated when Ion invokes—

Ye eldest gods
Who in no statues of exactest form
Are palpable ; who shun the azure heights
Of beautiful Olympus, and the sound
Of ever young Apollo's minstrelsy ;
Yet * * * keep revengeful watch
On falling nations and on kingly lines !

But this is an example of "looking backward" in which the Greek poets sought to start the machinery of their cosmology. In the truly primitive times there were no nations to fall because none had yet arisen, and no kingly lines for gods to watch. Neither were those eldest gods the grand concepts of Greek culture at its acme. The gods earliest in date were fashioned from the crude imaginings of the earlier men. The latter were chiefly concerned, besides scraping up a subsistence, about the interpretation of dreams, and the invention of totems and taboos. Connected with these were names and titles, lines of paint and tattoo and the forms of meeting and greeting. In short, they were occupied on things which to us seem insignificant, but which in their developed forms have moulded and marked the institutions of the world though, becoming abbreviated and disguised in their long descent, they are now but faintly traceable.

To the query "why do nations and peoples do anything as a custom?" the optimist answers "because it is right," which assumption yet further confuses the vexed question whether, in the nature of things, there is an absolute right and an absolute wrong ; for customs vary even unto opposition in different parts of the world, and not only in different but in the same periods of history. Therefore they cannot all be absolutely right. In matters large and small, vital and trivial, what is esteemed as virtue and merit at one place and time is condemned at others as vice and crime. Explanation has been attempted on the theory that there are distinct races of men each of which has its idiosyncrasy ; indeed, that by primordial decree each of them had the mission to do certain things and no others. By such theory fatalism is omnipotent and all men are marionettes. But this explanation depends upon a conceded classification of men into races, which has failed. A few years ago school-boys glibly recited the titles of the races of men with their charac-

teristics ; but now students who have devoted long lives to the subject find such classification to be so difficult that no two writers agree. This does not indicate the proposition that there are no distinct races of men ; indeed, it is possible that once there were many more races than have ever been recognized, the present condition being one of amalgamation. But the plot of the marionette show becomes confused when there is no agreement about its personages.

The chief justice of a high court lately declared that no race of men was good for anything which had not believed in only one God and allowed only one wife. As all the races of men have at some time believed in many gods and have allowed a plurality of wives, this dictum would condemn all ; but it is an example of hysteron-proteron, or "the cart before the horse." If the statement had been that polytheism and polygamy must be abandoned before the attainment of high culture is possible, it would have been historically true ; but as made, it is as inaccurate as to assert that no race is good for anything in which the men have not always worn trousers—a useful but recent invention of civilization. Instead of seeking an explanation of customs in race, it is more practical, as well as more scientific, to look for it in habitat and history—*i. e.*, in environment.

As a general remark, while the optimist declares about customs that "whatever is, is right," the anthropologist, knowing the once prevailing potency of religions, may change the phrase to "whatever is, is a rite," though perhaps the rite is in ruins.

An apparent exception occurs in the arbitrary edicts of fashion, styled very properly by Borachio as "~~a~~ deformed thief ;" but a distinction may readily be made between custom and fashion. Fashion is imitative and transitory. It is most commonly noticed in details of dress or ornament designed by some influential person to conceal a defect or display a beauty ; sometimes, however, in latter days by a conspiracy of manufacturers, tailors, or milliners. With the cessation of the special influence the imitation gradually declines, unless, indeed, genuine merits are discerned in the invention, in which case it is assimilated through the vital catalysine faculty. The method of human progress is empirical. The good and useful, when ascertained by experiment, are retained for further improvement throughout the ages, while the noxious or useless are sooner or later rejected.

Some interest attaches to the word etiquette. It is probably an orderly French corruption of the formula "*est hic questio inter N.*"

& *N.*" endorsed by the French procureurs upon their law papers, similar to our "*N. versus N.*," from which the primary French meaning of the word in the sense of a label or ticket evidently originated. As étiquettes were fastened outside of documents or parcels to indicate their contents and place, so étiquettes were given to people on ceremonial occasions to tell them where to stand and what to do. Thence grew up the secondary use of the term as descriptive of the ceremonies themselves. Therefore the slang phrase of approbation "that's the ticket" is etymologically correct.

The subject of the origin and history of customs is an immense one. Even its division of ceremonial institutions is far too large for the present limits. The writer essayed an initiative to it in "Manners and Meals" (AMERICAN ANTHROPOLOGIST, Vol. I, No. 3). The single group now selected as an example is that of verbal forms of salutation (those by gesture and posture to be hereafter presented), with such other ceremonial forms as are explanatory of or intimately connected with such salutations. In this the text-books will not be copied; indeed, some of the views presented are at variance with those of received authorities. In particular they dissent, though meekly, from some details in the work of that great writer and thinker, Herbert Spencer. No one can overprize his comprehensive grasp of intellect, his lucidity of style, and his wealth of illustration, but more especially the inspiring and far-reaching suggestiveness by which he has awakened and guided modern thought. Yet he is more beneficent as an educator of the mind than as an instructor in facts. In particular, his most admiring student must lament the Zoroastrian phantasy or dual antagonism of good and evil that mystifies his Principles of Sociology. To him militancy is Ahriman and industrialism is Ormuzd, and their conflict is forced to explain all the myriad problems of human life. But the known causes and effects are too numerous and diverse to be disposed of by one universal solvent. The complex knots must be patiently untied, and cannot be severed by the rusty sword of a vamped and varnished Parsee dualism. Nor does history confirm this prosopopœia of good and evil. Industrialism began very early, and is now in a high state of development among the most cultured nations; yet it exhibits within itself strife and turmoil, selfishness and cruelty, equal to all the similar crimes ever charged against militancy. The latter has by no means passed away, though the human race has surely advanced. In fact, an evolutionary advance is mani-

fest in militancy itself parallel with that seen in other lines of thought and action. Militancy, therefore, is not the cacodemon by whose overthrow alone the world has grown better.

The verbal forms of salutation may be divided into—1, those of a purely religious character; 2, those equivalent to a prayer for the health and temporal good of the person saluted; 3, those simply wishing health and prosperity without direct invocation of a deity; and, 4, those expressing personal or official affection or respect.

1. The Israelites, both in meeting and parting, used a word meaning "blessing," and the person addressed was thereby commended to God. The expressions "Blessed be thou of the Lord!" and "The Lord be with thee!" are traditional.

The Arabian often says, "God grant thee his favours!" also "Thank-God! how are you?" and the Turk, "My prayers are for thee" or "Forget me not in thy prayers." In Poland a visitor to a house will cry out, "The Lord be praised!" to which the hostess will answer, "World without end, Amen!" The "sweet girl graduates" of conventual schools in this country involuntarily answer a knock at their doors by the word "toujours" instead of "come in!" through the habit formed when the sister at the convent dormitory door used a formula in praise of the Virgin Mary, to which the obligatory response was "forever!" Very lately a similar custom prevailed throughout Spain by which the visitor ejaculated "Maria purissima!" the reply being "sin pecado concebida!" On other occasions the Spaniards say, "Vaya con Dios!"—"Go with God!" In the Tyrol people exchange the formula "Praised be Jesus Christ!" and the Neapolitans that of "Increase in holiness!"

2. The forms of greeting that pray for the health and well-being of the friend addressed are distributed generally. Indeed, our term "salutation" is derived from the Latin *salus*, and similar etymologies are found in other languages. The Ottoman cries, "Be under the guard of God!" In Arabia on the first meeting of the day the proper phrase is "May God strengthen your morning!" or "May your morning be good!" The Persian begins his polite address with "I make prayers for thy greatness." The return to a salutation in the Orient is sometimes not only religious but non-committal. If an Arab is directly asked about his health he responds "Praise be to God!" leaving his condition to be inferred from the modulation of his voice. If the form of the query is "Is it well with

thee?" the answer is "God bless and preserve thee!" The Zuni exchange the prayer "May the light of the gods rest with thee!"

Neither the English "good bye" or the French "adieu" need be explained, but an example within the writer's observation may be offered to show how meaningless words of ceremony originally significant may become, and how easily they may be adopted. The Micmacs two centuries ago picked up among a few French expressions that of "Adieu" as the proper word in friendly parting, and now commonly use it with the idea that it belongs to their own language. When questioned as to when they got it from the French, one of the chiefs haughtily exclaimed, "We did not get it from the French; they got it from us!" It may be noted that the French have in "au revoir" an alternative and less religious form used in parting, and other nations have similar expressions. The Cingalese bluntly say, "I will go and come."

3. The general wish for health and prosperity, of which the English "farewell" as distinguished from "good bye" is an example, is often only implied in the query showing interest as to the present possession of those blessings. The Arabs reiterate the query "How are you?" for some minutes, and, when well brought up, afterwards interrupt the subject of the conversation by again interjecting "How are you?" many times. Our "how d'you do?" has almost lost significance, as it is seldom noticed except by reciprocation; no one supposing it to be a *bonâ fide* request for information. Many other salutations abroad as well as at home—*e. g.*, "Good morning," "Hot day," "Cold day," or other meteorologic comments—are now mere watchwords or countersigns to indicate that the parties meeting are on good terms. Indeed, the origin of many old forms is the distinct declaration of peace, which was practically useful in the turbulent days when an enemy was more frequently met than a friend. This "passing the time of day" is now common at the occasional meeting of good-natured persons, by which the inane words form the friendly recognition of one of the same race. In Fiji the time of day regulates the terms of greeting. The inferior, before beginning his salute to the superior, always looks up at the sun and uses the phrase appropriate to its height.

The Chinese sojourners in Utah fell into a curious blunder in using some of our phrases. On meeting a resident at any time of day or night they called out "Good morning!" and on parting, "Good night!" even if it was before breakfast. A similar

error in imitation was made by the Zúñi. When the officers from Fort Wingate visited the Pueblo they were naturally anxious to reach the trader's store, so they called out to the first person met, "How are you? Where's the store?" The Zúñi caught up all the sounds as one greeting and in the kindness of their hearts shouted them to all subsequent visitors. The salutation "How-are-you—give-me-a-match" has a like explanation.

Moslems, while scrupulously saluting the meanest of their own communion, refuse all friendly greetings to the Jews. If inadvertently they have accosted one of that people with "Peace be unto you," or the like, they will hastily add "Death to you!" to which the Jew may respond, pretending to have heard only the beginning, by "The same to you!" in a spirit somewhat different from that in which the same words are used by us in answer to "Many happy returns!" on birth-day and other anniversaries. It may be mentioned that where the Jews are in power they give no salute whatever to one of the Goim, but scowl at him.

The North American Indians do not have many conventional forms of salutation. Their etiquette generally is to meet in silence and smoke before speaking, the smoking being the real salutation. But a number of tribes—*e. g.*, the Shoshoni, Caddo, and Arikara—use a word or sound very similar to How! but in proper literation Hau or Hao. Most of the Sioux use the same sound in communication with the whites, from which the error has arisen that they have caught up and abbreviated the "How are you?" of the latter. But the word is ancient, used in councils, and means "good," or "satisfactory." It is a response as well as an address or salutation. The Navajo say, both at meeting and parting, "Agalani," an archaic word the etymology of which is not yet ascertained. Among the Cherokee the colloquy is as follows: No. 1 says, "siyú," good; No. 2 responds, "siyú; tãhigwatsú?" good; are you in peace? To this No. 1 says, "I am in peace, and how is it with you?" No. 2 ends by "I am in peace also." Among the Zúñi happiness is always asserted as well as implored. In the morning their greeting is "How have you passed the night?" in the evening, "How have you come unto the sunset?" The reply always is "Happily." After a separation of even short duration, if more than one day, the question is asked, "How have you passed these many days?" The reply is invariably, "Happily," although the person addressed may be in severe suffering or dying. In quaint contrast with this Zúñi custom is that of the Japanese, where the party visited asserts the prosperity

of the visitor. The host and hostess politely ejaculate "Ohayo gozarimasu!"—"You have come quickly!"—which welcome is given even if the visitor has suffered delay and all kinds of mishaps. It is never contradicted. Perhaps our expression "You have been long in coming," as indicating longing and waiting, is no more artificial.

An interesting point in this connection is the objection of some peoples to being praised for flourishing health which is never admitted. For instance, to the Cingalese the expression "you look well" or "you have become stout" is very annoying, the reason being that the notice of malign deities would be attracted to their fortunate condition upon which it would be destroyed. This illustrates the old story of the jealous gods, and the power of evil being the most important deity, and recalls many classic fables in several lands and languages, among others that of the ring of Polycrates.

That this dread survives among some of the peasantry of Europe appears in their invariable refusal to respond that they are perfectly well, and a similar superstition has recently been reported from the mountains of North Carolina. The Chinese, in greeting, not only depreciate their own status, but exaggerate that of the party of the other part. The established ritual averages thus: "How is the excellent health enjoyed by your wealthy and accomplished highness, and that of the brilliant full moon his spouse, and of the strong lions his sons, and graceful gazelles his daughters?" The obligatory response would be; "The ignorant beggar whom your benevolence deigns to notice is in his usual condition of dirt and disease, and the sow his wife and pigs his offspring starve in their old filthy sty." Perhaps the elegant expressions of response by cultured persons in absolute health, "quite well, thank you," "passably," "about the same," and the like, considered to be a polite avoidance of boasting, have their origin in high antiquity.

Persons of general intelligence in the most civilized nations yet show relics of the dread of daimons when an epidemic prevails. It was lately noticeable here that the response about freedom from the gripe generally contained some qualification—"haven't got it yet," or the like.

The wish of salute is often specific, connected with the circumstances of environment. The people of Cairo anxiously ask, "How do you perspire?" a dry skin being the symptom of the dreaded fever. In hot Persia the friendly wish is expressed "May God cool your age!"—that is, give you comfort in declining years. In the

same land originates the quaint form "May your shadow never be less!" which does not apply, as often now used in Europe, to the size and plumpness of the body as indicating robust health, but to deprecate exposure to the noon sun, when all shadows are least.

The Genoese in their time of prosperity used the form "health and gain!" In some of the Polynesian isles the prayer for coolness is carried into action, it being the highest politeness to fling a jar of water over a friend's head. According to Humboldt the morning salute on the Orinoco is "How have the mosquitoes used you?" The old religious views of the Persians are found in their wishes: "Live forever!" and (still retained in Spain, probably a direct legacy from the Moors), "May you live a thousand years!" They believed only in this life, and that through divine favor it might be unlimited.

Some quaint theories have been presented with regard to the special phraseology of verbal salutation among several nations. It is contended that the Romans expressed their main interest concerning the vigor constituting the basis of a warlike nation by "*quomodo vales?*" literally, "how is your strength?" The French "*comment vous portez-vous?*" is supposed to be appropriate to a people attaching great value to agility and the manner in which the body is supported on its legs for immediate motion. The Italian "*come sta ella?*" may have reference to the posing dignity of the nation, while the German "*wie befinden sie sich?*" suggests the analytical and self-inspecting character of the Teutons. In the English "how do you do?" Krummacher, laying great emphasis on the word "do" as denoting action, distinguishes the energy of the people.

4. The terms of affection in greeting are too numerous to be now recited. The following are mentioned as unhackneyed and of interest. Some Orientals say "Thou hast made me desolate by thine absence from me," and the ordinary form of greeting among the Zulus is simply "I see you and I am glad."

The variant phrases of respect are also multitudinous. Perhaps the most distinct form in which the common and ancient expression of the East, "I am your slave," survives in Western Europe, is in the Piedmont district of Italy. The Spaniards, through the influence of Moors and Jews, have many relics of Orientalism. Its features become colloquial in the form *Usted* contracted from "*Vuestra merced,*" your mercy, your grace, often appearing in the phrase "I kiss my hands to your grace" and "I kiss your grace's hands."

But the forms of respect and subservience, more than those of affection, have become established into titles of honor and nobility; therefore can be presented with some defined system not boundless as are the epithets poured from the ardent imaginings of friends and lovers.

It is not, however, possible now to attack the grandiose division of human vanity to which Selden alone devoted one thousand printed folio pages. Perhaps the only civil title of ceremony, as distinct from official designation, legally existing in this country is that of Esquire, which has almost fallen into disuse, being chiefly employed by attorneys-at-law. But they have a right to it. An esquire was originally an attendant on a knight, but later in England the title was given to all officers of the crown, which included attorneys, who are officers of the courts. Hence the English jest of the last century that attorneys were only "gentlemen by act of Parliament." Such acts, being in force in our colonial period, applied to attorneys here, also officers of court.

Mister, corrupted from master, is but an abbreviation of magister, once corresponding with our term "magistrate," another instance of a dignified title becoming meaningless through indiscriminate application.

Sir, which has ceased to be a title in becoming the general form of address, has been generally derived directly from *Sieur*, the abbreviation of *Seigneur*, implying the lordship of land so essential to the feudal system that the legal maxim ran, "*point de terre sans seigneur*;" but the derivation of *sieur* and *sire* was from the same root, originally signifying "senior"—*i. e.*, elder, with the synonym of father. The form "*sire*" anteceded that of "*sieur*," and undoubtedly the term of respect involving the concept of elder and father long preceded the ownership of land. Terms of rank and gradation founded on seniority and paternity are fundamental in the sociology of the North American Indians, prevailed among the founders of Rome, and, as terms of respectful address, are still common in Asia and eastern Europe. Therefore when you address a man as "*sir*" you etymologically imply that he is your father.

The subject of titles in the United States presents some amusing features. The constitution prohibits titles of nobility, and of course the people insist upon all other kinds of titles, thereby proving the accuracy of the Roman poet's oft-quoted lines about the futility of casting out nature with a pitch-fork. Not only does a day's possession of any office baptize the possessor with a title for the remainder of

his life, but often official or professional titles are bestowed from mere fancy ; so that Colonel, Judge, and Doctor only imply some peculiarity in figure, manner, or clothing. In this multiplicity and plethora it is ridiculous for men to confer titles upon themselves without authority, as some do. It is far more dignified and distinguished not to bear or allow any. This is not on the principle, often too broadly asserted, that "the post of honor is a private station," but because all titles of honor and distinction have been degraded by misuse—*e. g.*, that of Professor, now the perquisite of balloonists and jugglers. But there can be no argument with a superstition. The best treatment of the folly would be that advocated to settle the liquor question—by high license and strict inspection. Let every man take what title he may choose, but pay for the privilege. The result would be that the craving would diminish or the revenue increase from the taxation of a useless luxury—either of which is a desideratum.

The special devices in grammar to mark grade of rank in address require too much detail for more than passing notice. In some languages obliquity and indirection are adopted ; for instance, the third person singular to address inferiors, the third person plural to superiors. The respect included in the idea of plurality, found also in sign language and pictographs, induced the general complimentary change from *thou* to *you* when but one person is addressed, though the expression has become so trite that its grammatical irregularity is not noticed. The regal first person plural was assumed by the Merovingian kings of France in formal decree and has since been continuously used by sovereigns and heads of government. Its adoption in the editorials of newspapers is perhaps in pretense of grandeur, but has some use because of its impersonality.

The connection between oral and written address is close, from which there is a natural transition to the formal parts of letters ; but it is needless to dwell upon adjectives of affection and subservience used with the address and signature. There are, however, some interesting points connected with the disposition of the address and signatures without reference to the phraseology. It is now merely a matter of individual taste whether the name of the person addressed shall precede the substance of a letter or follow that of the writer on the left hand, as is considered stylish by some social correspondents. But not long ago this was a point of supreme importance in social as it still continues to be in diplomatic correspondence. The name first appearing assumed the higher political

or social rank, and the relative position may pay a compliment or inflict an insult. It is also now supposed that the practice of occupying a line by the address and perhaps separating it by a vacant line from the body of the communication is a mere matter of convenience, but the space in question was once the subject of elaborate regulation. A private person writing to royalty used the largest sheet of paper procurable, and only four written lines at the bottom of the first page could be used to commence the communication, the remainder of the page being left blank after the formal title, which should be distributed through at least five lines. Six lines of the epistle to a prince might appear on the first page, and so on in graduation. Wars have been occasioned by the breach of this etiquette. The enmity between Cardinal Richelieu and the Duke of Buckingham arose because his haughty eminence addressed the Duke without leaving any space open after the title of *Monsieur*, which insult his grace returned in the same paper-sparing manner.

A graceful epistolary custom, in the line of salutation, is recorded by Madame de Genlis. It was a strict requirement among the French, who then made social laws for Europe, that all men, even the princes of the blood, should place the word "respect" in letters written to any woman. The French still use in such letters the phrase "respectful homage."

Some interest attaches to the mode of sending invitations to dinner and other formal parties. The superstitious, or, at least, irrational, ceremony in this regard is the edict still prevailing, that the invitations should not be sent by mail but by private hand. It is certain that in the modern regulations of the post office in large cities transmission of any considerable number of notes by mail is much more certain and expeditious than if private messengers were employed. Yet it is regarded as a serious dereliction to utilize the agency of the government in such cases. An explanation is derived from the time when givers of entertainments were supposed to support a large body of personal retainers whose main occupation was to convey commands to their subordinates and invitations to equals. Now very few persons employ servants in sufficient number to make delivery of many notes on the same day convenient. The pretense of such retinue is, therefore, a survival of an earlier social condition, but the curious point is that by a conversion of ideas it is the recipient of invitations by mail who now considers his dignity to be thereby impugned. It may be noted that the Algonkins

of the Ottawa before 1636 used to send out as dinner invitations specially cut pieces of wood about the size of the little finger. It was necessary to show these as tickets of admission to the feast.

Use of visiting cards comes in the same category with invitations. The great inconvenience connected with personal visits of mere ceremony has rendered it customary to adopt the expedient of leaving cards, which are very seldom deposited by all the individuals whose names they bear, and not infrequently, all pretense of personal presentation being abandoned, they are sent by mail. This abbreviated form of courtesy is of manifest advantage, and is in the direct line of evolution. It may be compared to that invention of the praying machine by the Buddhists, in which printed formulas of supplication are expedited to their divine address with regulated degrees of fervency by the revolution of a wheel, thereby attaining every purpose with great economy of time. It is gratifying to learn that a late Minister Resident of the United States to a European capital came to the front boldly on the card question, and kept before him a supply of his own visiting cards, a specimen of which he handed to each visitor as the interview ended, expressing the hope that as his excellency's time was so occupied the card might then and there be received as the equivalent of a personal return call.

All rules and details relating to addresses, titles, and ceremonial visits involve the assertion of and contention for precedence. These factors are of immemorial antiquity, being traceable to the principle of the struggle for existence and survival of the fittest, and have diminished with the decreased operation of that principle among men, not with the discontinuance of militancy. The extent of the surviving attention to precedence in England, as gathered from the mere literature on the subject, would be misleading. In the heraldic catalogues there are eighty-nine distinct sets of men above the rank of a burgess, who have their specified places in processions and even at ceremonious dinner parties, but every-day life is little affected thereby, always, however, remembering Thackeray's dictum that an "Englishman does love a lord." As regards ceremonies at dinner parties, the compliment of being served first has its disadvantages. Unless the guest thus distinguished exhibits greediness, the food placed before him will become either too cold or too warm before the others of the company can be ready. This is another case where the mean is golden.

The most illustrative notes on precedence appear in diplomatic history. Once at the court of France the envoys of Genoa and Brandenburg, being unable to agree as to which should present himself first to the king, stipulated that whichever first reached the palace on the day appointed should have the first audience. The prudent Prussian sought to make himself safe by sitting down on a bench in the hall of the palace all the night before; but the treacherous Italian, arriving near the proper hour and seeing his adversary half asleep on the bench, slipped by into the royal bedroom. Precedence must be maintained for mere dignity, without any direct object; so two ambassadors who met face to face on the bridge at Prague were obliged to stop there for the entire day because neither of them would disgrace his country by letting the other pass.

Ambassadors sought to increase the importance of their employers by fighting for their own. In 1661 the Spanish envoy attacked the carriage of the French ambassador in the streets of London, hamstringing his horses and killed his men; then went on joyfully with the conviction that he had done his duty, and that his rival could not get to court before him.

In cases of milder action it was usual to stipulate, by previous arrangement, for absolute and exact equality in every detail. This was the plan pursued when Mazarin and Don Louis de Haro met to settle the conditions of the marriage between Louis XIV. and Maria Theresa. The two ministers stepped together, with the right foot, side by side, into a council-chamber hung in corresponding halves with their respective colors, and sat down at the same instant precisely opposite each other at a critically square table on two mathematically equivalent arm-chairs.

The last connected chapter of Macaulay's History shows amusingly the waste of time and energy in which Kaunitz and Harlay watched one another's legs at the Congress of Ryswick lest a priority in muscular action should jeopardize, as the mere watching delayed, the peace of two continents. One of the most stupidly arrogant assertions of precedence was made by Napoleon in 1808. The *Almanach de Gotha* had just been printed for that year with the regular alphabetical arrangement of the reigning houses, beginning with the Anhalt duchies, but the parvenu Emperor suppressed the edition and required the whole to be printed with his name on the first page.

"Giving" or "taking the wall" in passing, so frequently alluded to in Shakespeare and other authors of his time as an indication of

rank, had tangible loss or advantage, as in the narrow and crowded street, destitute of sidewalks, proximity to the wall was safer and more convenient. But the same precedence on entering or leaving a room or passing through a door-way was contended for in vanity and pretension. A happy example of the modern politeness in which, both in form and fact, egotism has yielded to altruism is shown in the rivalry, now so frequent, when two men accidentally meet at a door or other passage, by which each presses the other to advance, thus showing a survival in reverse of the old contention for precedence.

Upon a general summary of the whole subject of salutation, it is obvious that it was once a serious tax upon time. Both in the Old and New Testament injunction was given, whenever expedition was required, "to salute no man by the way." The minute, tedious, and verbose politeness of the East was an insuperable impediment to rapid travel, and this is still the case among peoples of low culture such as the Araucanians, whose formalities of meeting and greeting occupy at least a quarter of an hour.

The utmost abbreviation of such forms appears among the most cultured of modern peoples and, through saving of time, is directly in the evolutionary line of utility; but it has still further significance. The phrases of ancient peoples and of existing savages and barbarians show intention to gain some definite or indefinite advantage by the special act of salutation. They are generally limited to classes and individuals, are sometimes with petition for or in declaration of peace, are made in personal placation or are the exchange of supplications to whatever deities or daimons may be credited with power. Cultured people do not now regard these objects to be appropriately connected with salutations of courtesy. They now use a brief, nearly meaningless formula almost indiscriminately, so that it has no special relation to the persons saluting and saluted or to their respective status. It is the recognition by one human being of another and is the best mark of real culture, its absence characterizing the savage or the boor. Its spirit is found in Talfourd's lines.

It is a little thing to speak a phrase
Of common comfort, which by daily use
Has almost lost its sense; yet * * 'twill fall
Like choicest music * * *
To him who else were lonely, that another
Of the great family is near and feels.

But it is not a little thing that a simple, kind recognition from man to man, even if often perfunctory, should replace the terms of elaborate egoism and stupid superstition. It is a sign of the evolution in which—

Love took up the harp of Life and * *

Smote the chord of Self, that, trembling, passed in music out of sight.

DANISH INVESTIGATIONS IN GREENLAND, 1876-'88.—In a late number of the *Geografisk Tidsskrift* (the journal of the Geographical Society in Copenhagen), v. 10, Nos. 3, 4, pp. 86-94, Dr. Rink reviews the work done by the Danes in Greenland during this period, as shown by the contents of the "Meddelelser om Grønland," which irregular periodical has now reached its twelfth volume.

He reviews the investigations under nine headings, namely: General geography of the country; formation of ice on land, glaciers; hydrography; surveying, astronomical observations; meteorological and other physical observations; geology and mineralogy; botany; zoology; ethnography and archæology. Under the last heading he speaks a few well-deserved words of praise for Capt. Holm's excellent report on the East Greenlanders, which forms vol. 10 of the "Meddelelser," and enumerates the following papers which have appeared in the series:

Jensen: "Ruiner fra Nordboernes Tid" (v. 1, p. 27).

Steenstrup: "Gedigent Jærn i en eskimoisk grav" (v. 4, p. 121).

Steenstrup: "Om eskimoiske grave" (v. 5, pp. 21, 25, and 37).

Holm: "Almindelig beskrivelse af ruinerne i Julianehaabs distrikt (Osterbygden)," with many plans and sketches (v. 6, art. 3).

Jensen: "Fjordene ved Holsteinborg efter ældre Beretninger" (v. 8, p. 43).

Jensen: "Ruinerne i Godthaabs Distrikt (Vesterbygden)" (v. 8, p. 100).

On pages 21, 249, and 254 of the same are miscellaneous notes by Hammer and Ryder on the Greenlanders and the former habitation of North Greenland.

Stenstrup: "Om Osterbygden, de gamle Kursforskrifter og Kaart" (v. 9, art. 1).

Rink, H.: "The Eskimo Tribes" (in English) forming vol. 11 of the series.

JOHN MURDOCH.

A WEST VIRGINIA ROCK-SHELTER.

BY W. H. HOLMES.

Through the representations of Mr. G. F. Queen, Mr. L. V. McWhorter, of West Virginia, was induced to open a correspondence with the Director of the Bureau of Ethnology in regard to an interesting cave or rock-shelter located in Harrison county, that State. The walls of this cave were said to be covered with pictographs, and the probability of securing material of importance to archæologic science seemed so great that I was instructed to visit the locality and make examinations. The journey was undertaken in September, 1889.

The geographical position of the site did not lead me to expect discoveries of unusual interest, as the region is remote from natural thoroughfares and separated by physical barriers from the favorite resorts of our ancient aborigines. A cave so situated could not be expected to contain evidences of long or extensive occupation, either by the mound-building nations of the west or by the tide-water tribes of the Atlantic coast. From a consideration of the conditions, I was led to expect precisely what, according to my own interpretation, was found—a medicine or prayer resort of the hunter tribes of comparatively recent times, probably of Algonkian or Iroquoian stock. The only surprise that awaited me was the discovery of such carefully elaborated and well preserved rock sculptures.

Locality.—In the southern part of Harrison county a small stream, known as Two-Lick creek, heading near the Little Kanawha divide, descends into the West Fork of the Monongahela at a point about four miles west of Lost Creek Station, on the Clarksburg and Weston railroad. Ascending the stream for a little more than two miles and turning to the right up a tributary about two miles in length, called Campbell's Run, we soon found ourselves facing, on the west side, a deep amphitheatre-like ravine or hollow, nestled in the narrow bottom of which are two farm cottages—the lower belonging to Mrs. Queen and the upper to Mr. Lawson. On the sloping hillside a few hundred feet above the house of the latter occurs the slight outcrop of sandstone beneath which is the shelter.

The Shelter.—A nearly horizontal stratum of massive carboniferous sandstone, in places exposed to a thickness of twenty feet or more, outcrops at various points around the lower slopes of the valley. At the shelter, some fifty feet above the stream bed, it is exposed to the thickness of ten or twelve feet and for a horizontal distance of perhaps thirty feet, with slight outcrops at the right and left. The slopes below and above are very steep, but are under cultivation nearly to the hill-tops, which are here 300 or 400 feet above the stream bed.

The recess in the rocks is the result of local surface undermining of the outcrop of sandstone assisted by roof degradation, and hence is a typical rock-shelter. At the opening it is about twenty feet long and in the deepest part extends back sixteen feet. The floor is nearly level, having recently been occupied by sheep, and a low, weed-covered ridge of débris, partly closing the chamber, extends along the outer edge beneath the eaves of the overhanging ledge. The opening is about four feet in height toward the left, but is much lower at the right. The uneven face of the shelving rock is from two to five feet thick, and the exposed upper surface is in places perhaps ten feet in width with the slope.

The roof of the shelter is unevenly arched and to the right of the center reaches a height of nearly six feet; toward the rear it curves downward into the concave back wall upon which the figures are engraved. The rock floor descends rapidly from the back wall and soon passes beneath the accumulated débris.

Petroglyphs.—The rock sculptures, of which simplified outlines are given in Fig. 1, occupy the greater part of the back wall of the recess, covering a space some twenty feet long by about four feet in height. At the left the line of figures approaches the outer face of the rock, but at the right it terminates in the depths of the chamber, beyond which the space is too low and uneven to be utilized. There are indications that engravings have existed above and below those shown in the sketch, but by exfoliation and falling of the roof and by disintegration and wear near the floor, traces of these are too indistinct to be followed.

If the animal figures, of which the picture is for the most part made up, represent the deities of those who engraved them—and this is the only tenable theory of their origin and execution—it is probable that one or more, pertaining to the upper regions, would

occupy the higher parts of the wall or the roof space overhead, and that one or more, belonging to the lower regions, would occur on the lower part of the available space. Be this as it may, it is probable that the figures now seen comprise the most important part of the original work.

The more legible designs comprise three heads, resembling death's heads, one human head or face, one obscure human figure, three birds resembling cranes or turkeys (one with outspread wings), three mountain lions or beasts of like character, two rattlesnakes, one turtle, one turtle-like figure with bird's head, parts of several unidentified creatures (one resembling a fish), and four conventional figures or devices resembling—one a hand, one a star, one the track of a horse, and the fourth the track of an elk, buffalo, deer, or domestic cow.

The serpents, placed above and toward the right of the picture, are much larger than life, but the other subjects are represented somewhat nearly natural size. The animal figure facing the two death's heads is drawn with considerable vigor and very decidedly suggests the panther. A notable feature is the two back-curving spines or spine-like tufts seen upon its shoulder; it is possible that these represent some mythical character of the creature. Two of the animal figures, in accordance with a wide-spread Indian practice, exhibit the heart and the life line, the latter connecting the heart with the mouth; these features are, as usual, drawn in red.

The human head or face is somewhat larger than life; it is neatly hollowed out to the nearly uniform depth of one-fourth of an inch, and is slightly polished over most of the surface. Ear lobes are seen at the right and left, and an arched line, possibly intended for a plume, rises from the left side of the head. A crescent-shaped band of red extends across the face, and within this the eyes are indistinctly marked. The mouth is encircled by a dark line and shows six teeth, the spaces between being filled in with red.

Probably the most remarkable members of the series are the three death's heads seen near the middle of the line. That they are intended to represent skulls and not the living face or head is clear, and the treatment is decidedly suggestive of that exhibited in similar work of the more cultured southern nations. The eye spaces are large and deep, the cheek-bones project, the nose is depressed, and the mouth is a mere node depressed in the center.

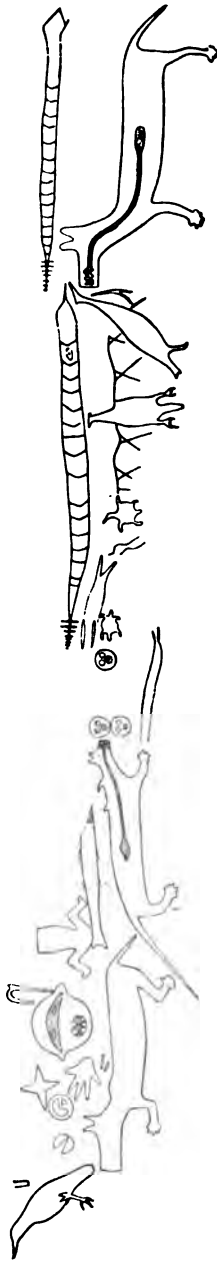


FIG. 1.—Outlines of petroglyphs, about one-thirty-sixth actual size. Red areas are dotted.

Exterior figures.—A few figures appear upon the exterior face and upper surface of the overhanging rock, and it is quite possible that others still have been obliterated by weathering. There are now but two sufficiently distinct to be made out; both are human figures. The one on the right represents a personage life size, with arms and legs extended to the right and left. The work is identical in character with that upon the interior of the chamber. The other figure, on the face of the rock above the left-hand side of the opening, is smaller and is about one-half obliterated.

Execution.—All the figures are clearly and deeply engraved and all save the serpents are in full intaglio, being excavated over the entire space within the outlines and to the depth of from one-eighth to one-fourth of an inch. The serpents are outlined in deep unsteady lines, ranging from one-fourth of an inch to one inch in width, and in parts are as much as one-half an inch in depth. The example at the left is rather carefully executed, but the other is very rude. I have omitted from the drawing a wing-like feature which forms a partial arch over the larger serpent. It consists of a broad line of irregular pick-marks which are rather new-looking and may not have formed a part of the original design; aside from this, there are few indications of the use of hard or sharp tools, and, although picking or striking must have been resorted to in excavating the figures, the lines and surfaces were evidently finished by rubbing. The friable character of the coarse soft sandstone makes excavation by rubbing quite easy, and at the same time renders it impossible to produce any considerable degree of polish. The rude

rounded stones obtained from the floor deposits of the shelter were undoubtedly employed in this work. The largest of these resemble ordinary hammer stones in size and shape. In several cases they have small pits in the sides, making it possible to grasp them firmly for striking. They were made from material indigenous to the locality—a rather soft coarse sandstone, like that of the stratum forming the shelter. The salient edges are rounded by use.

The red color used upon the large face and in delineating the life line and heart of the animal figures is a red ochre or hematite, bits of which, exhibiting the effects of rubbing, were found in the floor deposits of the recess. The exact manner of its application is not known—perhaps the mere rubbing was sufficient—but the color is so fixed that it cannot be removed save by the removal of the rock surface. There are indications that this color was employed in many parts of the work, now much changed by the ravages of time.

Excavations and Relics.—The mouth of the shelter was partially closed by a ridge of *débris* fallen from above. Inside of this the floor space, some twenty feet long by fourteen deep, was level, save for the presence of small masses of rock detached from the roof. In order to disclose the character of the contents of the ridge of *débris*, it was trenched transversely, beginning at the exterior base. The excavation was also carried across the floor of the shelter. Evidences of occupation by men and animals were confined exclusively to a thin surface deposit of dark earth, which contains ashes, bones, charcoal, and numerous small articles of artificial origin. The exterior ridge, as well as the substrata of the floor, were composed of half-disintegrated masses of sandstone that had fallen from above. The deposits containing artificial relics were in no place over a foot in depth and varied in thickness, as a result of the uneven surface upon which they were laid down. I expected to find near the center of the recess evidence of a fire-place, and a bed of ashes was found to the right of the middle point, under the apex of the roof. This bed of wood ashes, quite pure and but slightly compacted, rested upon the undisturbed rock floor and was from two to three feet in horizontal extent and in the central part about six inches deep. A row of flat stones had been laid along the lower side of the fire-place. The deposit of dark soil covered the ashes to the depth of a few inches. Scattered sparingly through the ashes and more plentifully through the surrounding earth were bits of bone, flint, and earthenware, with arrow-points, hammer or rubbing stones, and unio

shells. There was no well-defined stratification and no indications whatever of separate periods of occupation.

Pottery.—That the shelter was not a place of general or frequent resort or one at all employed for domestic purpose is sufficiently attested by the scarcity of remains of culinary articles. The earthenware recovered consists of about a dozen small fragments of pottery, found for the most part near the surface. The largest piece, obtained at a depth of six inches, is two inches in length and one-half an inch thick. The other fragments are not so thick, and do not average three-fourths of an inch in length. The material is clay, with a large percentage of tempering ingredients. A few pieces, including the large specimen mentioned above, are tempered with sand and bits of broken rock and break with an extremely jagged fracture; the others contain an excessive quantity of pulverized shell. The vessels represented, probably three or four in number, have apparently been rude, wide-mouthed pots. The surfaces are uneven and the exterior is finished in most cases with textile imprints, such as result from striking the soft clay with cord-covered paddles. This ware corresponds closely with the rude forms of aboriginal work found both east and west of the Appalachian highland.

Arrow Points, etc.—A few arrow-points of flint and quartz, and of usual shapes, were found distributed throughout the floor deposits. A number of small flakes of flint and bits of rock brought in by the occupants were noticed.

Red Hematite Paint Stones.—Taken in connection with the occurrence of red pigment in the wall sculptures, the finding of numerous small bits of red chalk or hematite are interesting. Some of the pieces, none of which are over an inch in greatest dimension, show artificially polished surfaces, the result, no doubt, of use in coloring the pictures.

Hammer and Rubbing Stones.—In looking for traces of the tools with which the engravings were made, nothing was found save the rude fragments of partially rounded, and in some cases pitted, sandstone previously mentioned. They occurred throughout the artificial deposits of the cave. Owing to the loosely compacted texture of the walls of the recess, these tools were probably fairly well fitted for the work of reducing the broader surfaces of the designs. In incising the narrower lines and indentations sharper and harder implements must have been employed.

Bone and Shell.—Scattered throughout the soil and ashes were numerous small fragments of the bones of birds and small quadru-

ped. One piece showed evidence of artificial modification ; this was a spatula-like bit of rib, from one-half to three-fourths of an inch in width and some four inches long, which had been smoothed on the concave side and sharpened at the edges. Valves of unio shells were found in considerable numbers. They are apparently of the species found in the neighboring streams.

Tribes Concerned.—The distinctive characteristics of the pictographic work left by our historic tribes are not sufficiently well known to be of use in this case in identifying the people concerned in the execution of these figures, but numerous analogies with Algonkian work are apparent. That the work is comparatively recent is evident from its fresh appearance, the condition and contents of the shelter floor, and the correspondence of the art relics with those of well-known historic peoples.

Conclusion.—Inquiry into the origin and purpose of these sculptures may be made. The first thought of the inquirer naturally is, that here is a primitive record that may possibly be read. This view is supported by the fact that a large body of similar work found throughout the country is intended to record statements or ideas. In this case, however, I incline to the view that there is nothing recorded to be read, that the figures were intended for no practical purpose, but owe their existence to the demands of superstition. It is reasonable to suppose that inscriptions designed to be read would be so placed as to meet the eye of others than those who made them. These works are hidden in a mountain cave, and even now, when the forest is cleared away and the surrounding slopes are under cultivation, this secluded recess is invisible from almost every side. The spot was evidently the resort of a chosen few. Such sequestered art has and always had a mystic office, and is ordinarily the work of the god-consulting anchorite or priest who hides away from the world to pray, to consult oracles, and to acquire prophetic powers. I infer that we have here, realized to the eye by sculpture and painting, the gods of the hunter priesthood, that the humble rock-shelter is an incipient pantheon of which the sculpture-enriched temples of Greece are the perfected type and the monotheistic cathedrals of to-day the most highly developed representatives.

Although many of our aboriginal races are known to have devoted much time and care to the delineation of personal and clan totems, it seems to me that no other than the deep and lasting motives connected directly with religion would be equal to the production of such elaborate and otherwise useless works.

RECENT WORK IN THE QUARRY WORKSHOPS OF THE DISTRICT OF COLUMBIA.—Excavation on the site of the stone implement workshops on Piny Branch was resumed as soon as the weather permitted this spring. Up to date five new trenches have been opened acrosss, or partly across, the old quarries in the plateau face. No new varieties of implements or worked stones have been found, but much has been learned in regard to the character and extent of the ancient quarrying, and additional light has been thrown upon the processes of manufacture.

One quarry face, encountered in the first trench dug, was ten feet in height, and when deserted by the ancient workmen must have presented a vertical or overhanging face at least twenty feet high.

In many places there are evidences of undermining, and the fact is developed that the operations of the ancient miners were rendered comparatively easy by their method of procedure. With ordinary stakes of wood burned to a blunt point it was not difficult to remove the disintegrated gneiss upon which the compact boulder bed rested, and then it was a comparatively easy matter to loosen and knock down the boulders. The stone implements were not shaped in the pits. The boulders were tested for texture and homogeneity by knocking of a flake or two, and if the result was satisfactory they were thrown to the surface to be roughed out and trimmed upon convenient spots around the margins of the pits or on level areas about the edge of the promontory.

The magnitude of the work is truly marvelous and exceeds the estimates made last fall.

Little evidence of a definite nature bearing upon the question of age has been secured. A hundred or a thousand years may have passed since the discontinuance of work upon this site. The ancient pits, dug in comparatively loose material, may have filled up in a few years, but no one can say that ages have not been consumed in reducing the art-bearing gravels of the slopes to their present condition. As previously shown, these gravels tell no story of time; they have been deposited uniformly throughout a period extending back from the present to a remote but undefined past. River gravels representing progressive erosion are not found in the Potomac valley, and as a consequence questions of age must be settled elsewhere. In the Delaware valley all the necessary elements of a time record exist, and there the record has been at least partly read. Rudely shaped tools have been found in gravels

dating back to, or nearly to, the glacial epoch. If these objects were buried in the gravels as the latter were laid down and are not upon the sites of more recent quarrying in these gravels, their great antiquity is clearly proved. It remains now to develop this point in the fullest manner, and then, if the interpretations of Doctor Abbott are shown to be correct, it will be necessary to seek the quarries and workshops that must exist somewhere in the valley above Trenton. If these are found and exhibit phenomena corresponding closely with those observed in the valley of the Potomac, a strong presumption will be created that the conditions are uniform in the two valleys, that the gravels presumed to exist here beneath tide-water contain the relics of prehistoric stone art, as surmised by Professor McGee, and that the work is very ancient.

No matter, however, how strong such a presumption may be, it cannot without additional verification amount to a demonstration. Similar work may have been done by different peoples and in widely separated periods of time. We know that there were populous fishing communities in the valley of the Potomac not 300 years ago, and that fishing was carried on by means of spears. The probabilities are that stone points were used for these spears. The general use of such points implies extensive manufacture and extensive quarrying of the material employed, and the existence of the great quarry-shop sites recently examined may thus be sufficiently explained without resort to the theory of a paleolithic man.

Operations on the Piny Branch site are nearly concluded, and another site on the west side of Rock creek near the new Observatory will next receive attention.

W. H. HOLMES.

ETHNOLOGY OF WEST AFRICA.—Captain L.-G. Binger's communication entitled "*Du Niger au Golfe de Guinée par Kong*" to the Société de Géographie, of Paris, published in its Bulletin for the third trimestre, 1889, gives a list of the tribes and linguistic families found by him in that heretofore unexplored region. His primary division is into seven ethnic families. Their names and those of their subdivisions are as follows, the French literature being retained :

1st. The Mandé family (Mandingue, Bambara-Malinké, etc.), which stocks with inhabitants the states of Samory, of Kong, parts

of Ouorodougou, of Kouroudougou, of Diammara, of Goudjà, and which has its colonies nearly all over the district. This is eminently the encroaching race.

2d. The Siene-ré or Siénou-fo group, which constitutes the population of the states of Tiéba, Pegué, Follona, Djimini, and a part of Ouorodougou.

3d. The Gouroun-ga group, which inhabits Gourounsi and a part of Boussang-si.

4th. The Mo group, which inhabits Mossi and which seems to have relationship with the Bimba (gourma) group.

5th. The Haoussa-dogomba-mampourga group.

6th. The Peul family, which is situated north of the regions which Captain Binger visited, towards Djenné and Macina. Only a few colonies from there have succeeded in establishing themselves in the zone visited, and have not descended south of the eleventh degree of latitude.

Besides these seven great families, other peoples were met and less completely studied, which will be treated of more at length in a future work. Their names are as follows:

Tagoua, Samokho, Tourouga, Tousia, Mboin Keréboro, Pallaga, Tago-Komono-Dokhosié, Tiéfo, Bobofing, Bobo-Oulé, Bobo-Dioula, Léna, Dafina, Ménégué, Sommo, Kipirsi, Nonouma, Oulé, Dagari, Dagabakha, Bougouri, Lobi, Gâne, Diane, Lakhama, Lâma, Youlsi, Tiensi, Nokhorissé, Tiansi, Mampourga, Dagomba, Goudjà, Achanti, Ligouy-Diammoura, Ton, Pakhalla, Agni, Fallafalla, Kippirri, Kourou, etc., etc.

To this list the people of the lague of Grand-Bassam must be added. An ethnographic map is furnished with the communication.

There are altogether more than sixty peoples among whom ties of relationship are apparent, but who speak a number of different languages and dialects. Fortunately the Mandé and the Haoussa are eminently commercial and are to be found throughout the district, so that with some knowledge of their languages and of Arabic travelling is possible.

GARRICK MALLERY.

A ZUNI FOOT-RACE.

BY F. WEBB HODGE.

When the Sun Priest announces the arrival of planting time, and the herald proclaims from the house-tops that the planting has been done, the seasons for foot-racing in Zuni are at hand.

The first races of the year, while interesting ceremonially, are by no means so exciting as those which follow later in the season when the planting is finished. These preliminary races are over a short course and are participated in by a representative of each of the six estufas. Six prayer-plumes and an equal number of race-sticks are made by the Priests of the Bow, the latter of which are placed in the trail about two miles from the starting point. When the time for the race has been decided upon, which may not be until three or four days after the race-sticks have been deposited by the priests, the six representatives of the estufas run to the point where they are, and each man finds and kicks one of the sticks in a small circle homeward. This race is a contest between the six individuals comprising the racing party, and no betting is engaged in.

The great races of Zuni, and those in which the chief interest is centered, occur after the planting—the time when nearly all the men are at leisure. In selecting the participants in these races, the swiftest-footed of the young men of the northern half of the pueblo are matched against those of the southern, or of the western half against the eastern. The number of racers on a side varies from three to six, and the degree of interest taken in the contest depends upon the reputation of those engaged in it, and particularly upon the extent to which betting has been indulged in.

As soon as the choice of sides has been made, the wagering begins, and increases with good-natured earnestness until the time for the foot-race arrives. Every available hide and pelt is brought to light from beneath the piles of stores secreted in the back rooms and cellars, to be converted into cash or gorgeously colored calico, and the demand upon the trader for goods is unequaled except when a great dance is approaching. Money, silver belts, bracelets and rings, shell necklaces, turquoises, horses, sheep, blankets, in fact anything

and everything of value to the Indian, are offered by a resident of one side of the pueblo in support of his favorites against something of equal value held by a champion of the opposing side.

On the evening of the day before a long race takes place, the participants repair to a secluded spot in one of the mesas some miles from the village, where a hole a foot or two in depth is excavated, in which is deposited, with due ceremony, a quantity of sacred meal and two cigarettes made of native tobacco (*ah-na-té*) rolled in the husk of corn. When this portion of the ceremony has been concluded and the hole filled, the Indians move away for a short distance and sit for a while without speaking above a whisper, when they start for the pueblo. On their way should a roosting bird become frightened and take flight, or the hoot of an owl be heard, the sign is a warning to defer the race. But if lightning be seen or a shooting-star observed, the omen is considered a favorable one and the race takes place on the day following.

The racers are greeted on their return by a priest who offers a blessing. A single cigarette is made and passed around among the number, after which one of them recites a prayer. The preparatory ceremonies being now completed, the racers retire into the house of the priest, who extends his hospitality until after the event.

The following morning, the day of the race, the runners arise even earlier than usual, take a short run, and return to await the time appointed to start. In the meanwhile they make bets with one another or with any one who may happen in. About an hour before starting they partake sparingly of paper-bread (*hé-we*) soaked in water, after which they doff their every-day apparel and substitute breech-cloths, the color of which is either entirely white or red, dependent upon the side to which the wearer belongs. To prevent the hair being an impediment to progress, it is carefully and compactly arranged above the forehead in a knot by one of the Priests of the Bow. To this knot or coil an arrow-point is invariably attached as a symbol of flight, or perhaps as a charm to insure to the runner the swiftness of the arrow. The arrow-points having been thus placed, the same priest, holding in each hand a turkey-quill, pronounces a blessing and leads his charges to the starting point.

Without, the excitement is intense. The women discuss with one another the probable outcome, and engage in betting as spiritedly as the men. Here may be seen a fellow who has wagered

all he possesses—if he wins, so much the better, and if all is lost he takes the consequences philosophically and trusts success will visit him next time. Another may be seen who has ventured all his own property as well as that of his wife, and if he fails to win a divorce is imminent. The small boys also are jubilant. When the race was first proposed they sought their companions, selected sides, and staked their small possessions on the results of their own races with a zeal that would have become their fathers.

The articles that are to change hands at the close of the race are placed in a heap in the center of the large dance-court near the old Spanish church. Around this pile of valuables a crowd gathers, on horse-back or afoot, to take advantage of the few moments that remain in which to make their final wagers. As the runners emerge from the house under the leadership of the priest, they are followed by the excited crowd to the smooth ground on the opposite side of the river, from whence they usually start.

A Zuñi foot-race is not entirely a contest of swift-footedness, although much, of course, depends upon that accomplishment. In preparing for the start the members of one side arrange themselves several paces apart in an irregular line in the course to be pursued in such a manner that the movements of their leader at the point of starting can be readily seen, those of the contesting party posting themselves in a similar line a few feet away. The leader of each side places across his foot at the base of the toes a rounded stick measured by the size of the middle finger. Just before the signal is given to proceed a mounted priest goes ahead sprinkling the trail with sacred meal.

At the signal each of the two leaders kicks his stick as far in advance as possible, when the racer of his side who happens to be nearest its place of falling immediately rushes for and again kicks it, his companions running ahead in order to be in readiness to send the stick on its further flight. This operation is continued throughout the entire course, the racers in the rear each time running in advance as rapidly as possible that they may kick the stick as often as their companions.

Not infrequently the first kicking of the sticks sends them flying over the heads of the second and even the third racers in advance, and they fall near each other. The excitement at this occurrence is very great, for none of the dozen young men spare themselves in scrambling over and pushing one another in order to secure the stick and send it on its course. No difficulty is experi-

enced by a racer in recognizing the stick of his party, that belonging to one side having a band of red paint around the center, the other an additional though narrower stripe around both ends.

Considering the extreme lightness of the race-stick, the distance which it is sent by a single kick, or rather toss, with the toes is remarkable. Very often a stick is raised aloft in this manner about thirty feet and falls at least a hundred feet from the point at which it was lifted. Nor is the distance which the stick is sent the only requisite of success. Sometimes a narrow, sandy trail bordered by weeds is to be traversed, and a careless kick will probably send the stick into the brush or into an arroya, where great difficulty may be experienced in regaining it, since a racer is never allowed to touch a stick with his hands until he reaches the goal. Again, throughout the rough race-trail the character of the land surface varies greatly, and long stretches of deep sand alternate with rocky passes, arroyas, and hills clothed with scrub timber or sage-brush. Indeed, smooth ground is seldom met with over the entire course of twenty-five miles.

Accompanying the participants may always be seen two or three hundred equestrians—those who, more than any others, are interested in the outcome of the race by reason of the extent of their prospective gains or losses. When one side follows closely in the track of its opponent the horsemen all ride together, but when, by reason of accident or inferiority in speed, a party falls considerably in the rear, the horsemen separate to accompany their respective favorites. If the season is dry the dust made by the loping horses is blinding, but the racers continue apparently as unmindful of the mud-coating that accumulates on their almost nude, perspiring bodies as if they were within but a few steps of victory.

On they go from the point of starting over the southern hills, thence eastward to Thunder Mountain, along the western base of which they proceed to the basaltic rocks through which the Zuffi river runs. Keeping close to the mesas that form the northern boundary of the valley, the racers cross the river on their return at a point about two miles west of the pueblo, whence they continue to the western end of the southern hills first crossed. These having been skirted, they pass over the low, sandy corn-fields to the goal, followed by the yelling horsemen, who wave yards of brilliant calico as they dash forward with the final spurt of the racers. When the goal is reached the first racer of the winning *sidé* takes the stick

into his hands for the first time since starting. With renewed energy the individual members of the successful party put forth every remaining effort to be the first to arrive at the central plaza of the pueblo. He who gains it first is considered the superior racer of all, and his honor is indeed well earned. Running as rapidly as possible once around the heap of stores, at the same time breathing from his hand the "breath of life," the victor, stick in hand, continues at a running pace to his home.

Curiosity prompted me to note the time occupied in performing this feat, which was found to be exactly two hours.

Like almost every undertaking of the Zúñi, the foot-race has more or less of a religious significance, as will be seen from the initiatory ceremonies. The opposing racers who await the signal to give the stick its first toss place turquoises or shell beads beneath the stick that they may be sacrificed at the first lifting of the foot. In the belief of the Zúñi the stick has a tendency to draw the racers on, and as long as it can be kept in advance their success is, of course, assured. The cause thus follows the effect in the same manner as it does when in Zúñiland the summer comes because the butterflies appear, and it departs because the birds take their flight.

Training for a Zúñi foot-race begins at childhood. At almost any time a naked youngster of four or five years may be seen playing at kicking-the-stick outside the door of his home, or, if a year or two older, coming from the corn-field—where he has been dutifully engaged in frightening off the crows—tossing the stick as far as his little feet will allow him.

L'ANTHROPOLOGIE.—With the November number the Revised Anthropologie, founded in 1872 by Paul Broca, ceased to exist as a separate journal. In January of the present year the three great journals, *Matériaux pour l'Histoire de l'Homme*, the *Revue d'Anthropologie*, and the *Revue d'Ethnographie*, were united, and the new journal has appeared with the title *L'Anthropologie*, a bi-monthly journal under the editorship of MM. Émile Cartailhac, E. T. Hamy, and Paul Topinard.

By this concentration of their efforts these three gentlemen will doubtless make the new journal as efficient as the old ones combined. It will be a difficult task, however, as all know who have read carefully the journals founded by Mortillet, Broca, and Hamy.

O. T. MASON.



DEATH OF HANS HENDRIK.—A late number of the *Geografisk Tidsskrift* reports the death of this famous Eskimo, who was probably better known to the civilized world than any other of his race, with the possible exception of Capt. Hall's companion "Eskimo Joe," for he rendered excellent service in four polar expeditions. The last ship which came from Greenland in 1889 reports his death at Godhavn on August 11, 1889. A brief account of his life is given by Lieut. C. Ryder of the Danish navy (*Geografisk Tidsskrift*, v. 10, 1890, pt. 5-6, pp. 140-143).

He was born at the Moravian station of Lichtenfels, in South Greenland, in 1834, and was educated by the missionaries, joining Dr. Kane's second expedition in the brig "Advance," in 1853. When that ill-fated vessel was abandoned, in 1855, Hans chose to remain behind with the Eskimos of Cape York, where he lived for five years, marrying an Eskimo girl, who afterwards came back with him to Danish Greenland, where she was baptized.

He joined the expedition of Dr. Hayes, in 1860, at Cape York, and returned with it to Upernivik, in Greenland. Here and at Prøven he remained for several years in the employ of the Danish traders.

Accompanying Capt. Hall in the "Polaris" expedition of 1871-'73, he was one of the unfortunate party who became separated from the vessel on an ice floe, and drifted from 77° 30' north latitude to 53° 30' off the coast of Labrador, where they were finally picked up by the "Tigress," a steam-sealer. It was to the efforts of Hans and his comrade, "Eskimo Joe," that the party of nineteen owed their lives during their drift of over six months.

After passing the winter of 1873-'4 in America he returned to Upernivik, and in 1875 joined the English discovery-ship "Alert," sharing in the exploration of Lady Franklin Bay and many other sled expeditions. After his return, in 1876, he was employed by the traders, chiefly at Upernavik, Egedesminde, and Godhavn, at which last place he spent the last years of his life. His last journey was in 1883, when he went as pilot and interpreter on board the Swedish steamer "Sophie," which visited Cape York, under command of Dr. Nathorst, while Nordenskiöld was making his journey into the interior of Greenland.

"With his virtues and his faults," says Lieut. Ryder, "he was a good type of the Greenlander, and he was one of the many among this race who have saved white men from dying a miserable death among the icy wastes of the polar regions." JOHN MURDOCH.

**THE HISTORY OF THE "THROWING-STICK" WHICH
DRIFTED FROM ALASKA TO GREENLAND.**

BY JOHN MURDOCH.

One of the strongest arguments advanced by Dr. Frithiof Nansen, whose successful expedition across Greenland has won him so much honor, in favor of his plan for reaching the North Pole by drifting with the ice north and west from Bering Strait is the fact that an Eskimo "throwing-stick" or handle for casting darts has undoubtedly made this very drift.

Reviewing the evidence in the March number of *Naturen*, he shows conclusively that this little piece of wood, fortunately of such characteristic shape that its history is unmistakable, has floated from Bering Strait to the west coast of Greenland, undoubtedly passing over or close to the North Pole.

As this remarkable case has attracted little or no attention outside of the Danish and Norwegian journals, I propose here to review in detail the history of the specimen. Some time ago the Norwegian Magazine *Naturen* published a notice of the meeting of the "Videnskabselskab" at Christiania on June 11, 1886.* In this notice it was stated that "Y. Nielsen (the curator of the University Museum) exhibited a throwing-stick for a harpoon, found among driftwood at Godthaab; it is of a form unknown in Greenland, but agrees completely with the throwing-stick used in Alaska. It has therefore probably made the same journey as the relics of the Jeannette expedition found at Julianehaab."

It immediately occurred to me that with the extensive collections at our disposal in the National Museum, in connection with the observations published by Professor Mason,† it would be easy to arrive at an almost certain conclusion about the specimen in question. I therefore wrote at once to Dr. Rink, in Christiania, who I know would be interested in any matter concerning the Eskimos, and who was probably present at the meeting of June 11,

* *Naturen*, vol. 10, No. 11, p. 176.

† Throwing-sticks in the National Museum. By Otis T. Mason. (Smithsonian Report, 1884, pt. II, pp. 279-289.)

making further inquiries about the specimen, asking especially for a figure of the throwing-stick if one could be procured.

With his usual promptness and courtesy, Dr. Rink at once responded by sending me a carefully made outline sketch of the specimen drawn by himself.

I had not the slightest difficulty in identifying this with one of Mason's types, namely, that used in the Kaviak Peninsula, Norton Sound, and the Yukon Delta. It most closely resembles a specimen from the Kaviak Peninsula now in the National Museum. It was seen at once that the resemblance between these two objects was altogether too striking to be the result of accident. I then wrote to Dr. Rink, stating that in my opinion the "throwing-stick" was undoubtedly Alaskan and probably from the Kaviak Peninsula.

On receiving this confirmation of his previous views in regard to the origin of the specimen, Dr. Rink published a paper in the "*Geografisk Tidsskrift*,"* in which he gives the history of the specimen in detail. This account adds considerably to the authenticity of the "find."

It appears that Dr. Rink himself found the throwing-stick, which the Greenlanders at once recognized as different from any they had ever before seen, among the driftwood collected at Godthaab some years ago. This driftwood, as is well-known, is brought round Cape Farewell from the east and carried up the west coast of Greenland. Quite by accident, as he says, Dr. Rink preserved the specimen until 1886, when the university at Christiania received a valuable selection of ethnographical specimens from the Danish East Greenland expedition under Holm and Garde. He then presented the specimen to the university, apparently supposing that it came from the same region. On examination, however, it proved that it was different from the East Greenland throwing-sticks, as well as from those from the west. The well-known Norwegian traveler, Jakobsen, who has collected in Alaska, as well as in Greenland and Labrador, was struck, on examining the collection, with the resemblance of this specimen of unknown origin to those he had seen in Alaska. This gave rise to Nielsen's communication to the "*Videnskabselskab*," in which he compared the probable drift of this object to that of the Jeannette relics, in confirmation of Professor Mohn's theory of a current running across close to the North Pole.

* *Formodet Drift af et Fangeredskab fra Alaska til Greenland.* (*Geografisk Tidsskrift*, vol. 9, No. 4, pp. 75-76. Copenhagen, 1887.)

The points specially mentioned by Dr. Rink as those in which this specimen differs from those used in Greenland, namely, the "pocket" for the forefinger and the peg for one of the other fingers, are precisely those which indicate its Alaskan origin. The fact that it is inlaid with beads, though Dr. Rink lays considerable stress on this, is probably a mere accident and of no value in classification, though it appears to be true that this style of ornamentation is far more common in Alaska than in the east. Of more importance is the shallow groove along the back of the implement, appearing on both specimens compared. The general resemblance in shape between the two is especially striking.

It seems to me unreasonable to doubt that the implement in question was actually made in Alaska, not far from Bering Strait, and there seems to be no way of accounting for its presence at Godthaab, unless it really drifted all the way from Bering Strait to the coast of Greenland. What we actually know of the currents in the Arctic Ocean indicates the possibility of such a drift. There appears to be more or less of a northerly current north of Bering Strait, and the drift of the *Jeannette* itself indicates a constant westerly movement in high northern latitudes.

Dr. Rink's suggestion that we know nothing of the people who undoubtedly inhabit the east coast of Greenland north of latitude 68, and that this implement may have been made by them, appears to me to carry less weight than he supposes. Mason has shown in the paper mentioned above that this implement has developed in certain distinct lines, which have a definite geographical distribution. The specimen in question belongs to a highly specialized type, widely different from the equally specialized type found in Greenland. If in any part of East Greenland a throwing-stick was found resembling that used in the Mackenzie River district, there would be nothing surprising in it, for this implement is of an exceedingly simple and generalized pattern, but it is in the highest degree improbable that specialization should result in two forms identically the same in regions so far apart.

In the preceding remarks I have followed the nomenclature of Professor Mason and most other American and English writers in calling these implements "throwing-sticks." They are also called "throwing-boards," "hand-boards," or "darting-boards." The objection has been raised to these names that "throwing-stick" should mean a stick to be thrown, like those used by many savages,

while "hand-board" is too indefinite, giving no indication of the use of the implement.

On the drawing furnished me by Dr. Rink he has written the name "harpoon thrower." This seems to me an entirely unobjectionable and very expressive name, and I think its use in ethnographic work is much to be commended.

[The above point with reference to the ineligibility of the name "throwing-sticks" for these implements seems well taken. Dr. Rink's term "harpoon thrower" while perfectly applicable to the implement used by the Eskimo is quite out of place elsewhere, as in Australia, where the implement in question has a wide distribution. It is suggested that the term spear thrower is preferable since it covers the functions of the implement fully, and sufficiently distinguishes it from the throwing club or stick, also of wide distribution, which is a missile.—EDITOR.]

THE ANDAMANS AND ANDAMANES.—In an article entitled "The Andamans and Andamanese" (*Scottish Geographical Magazine*, Vol. 5, No. 2, Feb., 1889, pp. 57-73) Col. T. Cadell, Chief Commissioner of the Andaman Islands, gives an interesting general account of these very primitive savages. Perhaps the most striking thing in the article is the favorable account he gives of the appearance and disposition of these people, who have generally been presented to the world in a very unfavorable light. He scouts the idea of their ever having been cannibals, and goes on to describe them as "well-made, dapper little fellows," with "smiling, innocent faces," and "pleasant to look upon"—"such jolly, merry little people. * * * You cannot imagine how taking they are. Every one who has to do with them falls in love with them." By kindness and liberality the English have succeeded in gaining the affections of all the inhabitants of Great Andaman except the Járáwas, who speak a "totally different language" and differ in their customs and weapons, and friendly relations are gradually being established with the people of Little Andaman.

JOHN MURDOCH.

NOTES ON INDIAN CHILD-LANGUAGE.

BY A. F. CHAMBERLAIN.

To the language of the Indian child but little attention appears to have been given. Its importance for comparison with the speech of children in other parts of the globe is very great, and its investigation may shed some light upon theories of the origin and development of language such as the one set forth by Mr. Horatio Hale. In the last few years there have appeared several valuable works relating to the general subject of child-language, its phonology and vocabulary. Besides the studies of Schultze¹, von der Gabelentz², and Taine³, we find in "Titin: A Study of Child-Language," by Señor D. A. Machado y Alvarez, of Seville⁴, a most interesting investigation of the language-development of the Señor's two children, both as regards sound and signification. Only last year Prof. A. H. Sayce⁵ published a list of curious words belonging to the "Children's Language in the Omani Dialect of Arabia," and Mr. Hale⁶, in his elaborate essay on the "Development of Language," has dwelt upon many of the peculiarities of infantile speech, as also has Prof. Joseph Mikch⁷ in his interesting essay "L'Idée et la Racine." The articles of Señor Machado and Professor Sayce will be of considerable value for comparison with the Indian data given in this paper.

Canon Farrar⁸, discussing the question whether children if left to themselves would evolve the rudiments of a language, makes this statement:

"It is a well-known fact that the neglected children in some Canadian and Indian villages, who are often left alone for days, can and do invent for themselves a sort of *lingua franca*, partially or wholly unintelligible to all except themselves."

¹ Die Sprache des Kindes, 1880.

² See Hale, Op. cit., p. 113.

³ In Revue Philosophique, 1876, pp. 1 *et seq.*

⁴ Trans. of Philol. Soc. (Lond.), 1885-'7, pp. 68-74.

⁵ "Academy" (London), No. 915, November 16, 1889, pp. 324-'5.

⁶ Proceedings of Canadian Institute, 3rd series, Vol. VI, 1887-'8, pp. 92-134. Espec. pp. 96, 97, 113, 132.

⁷ Revue de Linguistique et de Philologie comparée. Tome XIX, 1886, pp. 189-206, 213-231. Espec. pp. 195-197.

⁸ Chapters on Language. New Edition, London, 1873, p. 14.

The writer has not as yet been able to discover by what authority this assertion is made, but, having had his attention drawn to the subject, has gathered together some information which may prove of interest and value.

A search through a dictionary for "child-words" is but too often labor lost or nearly so. For example, the "Arawak-deutsches Wörterbuch" contained in the Bibliothèque Linguistique Américaine¹ yielded only the following:

Awáwa (Väterchen, Papa).—Papa. The ordinary Arawak word is *iti* (Vater, Vaterbruder, Mutterbruder).

Jája (Hängematte).—Hammock. The usual Arawak word is *uk-kura* (*ukkurahü*) or *hamaka*.

Seessuban (sich setzen, sitzen).—To seat one's self, to sit down.

The usual Arawak word is *abaltin* or *aballatin*.

While among the Mississaguas of Scugog, Ontario, in the summer of 1888, the writer was able to discover only two words used specially by children: *itit* (= father, papa) and *dòdò* (= mother, mama). These words (sometimes with interchanged significations) occur very frequently, with more or less modified vocalism, as the names for "father" and "mother" among primitive peoples,² and may not ineptly be compared with our own English *dada*, etc. From the Rev. Allen Salt (a Mississagua) two other words were obtained: *Tup-pe-ta*.—Greasy. The ordinary word is *pemedáweze* (it is greasy). *Num-na*.—Sweet. The ordinary word is *wéeshkoobun* (it is sweet).

A careful examination of the Algonkin Dictionary of the Abbé Cuoq³ has yielded the following "child-words," which the writer has extracted and arranged alphabetically:

Bobo.—Hurt. Used by parent to child. *Andi hobo?* Where are you hurt? The word is borrowed from French *bobo*.

Djodjo.—Used: 1) by child wishing to be suckled, 2) = mama, mother. In the latter sense it is used not merely by children but also by grown-up persons, who often say *ni djodjo* (my mother), *ki djodjo* (thy mother), etc., instead of the usual *nin ga*, *ki ga*, etc. Cuoq considers *djodjo* to be a child-word for *totoc* (*totosh*, teat, breast).

¹ Tome VIII, Paris, 1882. See pp. 104, 120, 153.

² See the list given by Buschmann in *Verh. der Berl. Acad. des Wiss. a. d. Jahre*, 1852, Berlin, 1853; also Uméry in *Revue Orientale et Américaine*, VIII (1863), 335-338, and Wedgwood, *Dict. of Engl. Etymol.*, 3d ed., 1878, li-lit.

³ *Lexique de la langue algonquienne*. Montréal, 1886.

E, é, ê!—Yes. The affirmative particle used by children consists of *é* repeated several times.

Enh.—No. Used by very young children. Cuq remarks the curious fact that with adults, *eh*! or *enh*! signifies “yes,” and states that its pronunciation “varies according to the age, sex, condition, and sentiments of the speaker.”

Ioio.—Hurt (same as *bobo*). From it are formed: *ioioc* (bad hurt), *ioiociw*, *i* (to have a bad hurt).

Kaka.—1) game, 2) tender part of flesh. Cuq says that little children denote by this word all sorts of game (bear, beaver, deer, partridge, etc.), and also, in particular, the tender part of the flesh of birds, amphibious animals, fish, etc. A derivative from this word in use in the language is *kakawandjigan*, cartilage, marrow, soft part of animals, fish, etc.

Kakac (*kakash*).—1) = *Pipi* and *caca* (French), 2) dirt, filth, uncleanliness. A mother will say to her child *ki kakaciki* (tu fais *caca*, tu fais *pipi*), *ki kakaciw* (thou art dirty).

Koko.—Name given by little children to any terrible being. This is probably the *Gougou*, that monster of the Indian imagination of which we read in Champlain and Lescarbot, and which was supposed to live on an island in the Baie des Chaleurs. Indeed, Lescarbot¹ speaks of “la plaisante histoire du *Gougou* qui fait peur aux petits enfans.” A mother says to her child *koko ki gat aiawik* (beware of the koko).

Labala.—An individual of the white race.

Lolo.—Used by little children when asking to be put back into the cradle. Cuq compares the French *dodo*.

Mamon.—Used by mothers to little children to induce them to go to sleep.

Nana.—Everything that is eaten without the aid of a spoon.

Nanan.—Candy, sweetmeats, bon-bons. Cuq considers that this word is probably of French origin.

Paboc (*pabosh*).—Everything that is eaten with a spoon.

Pipi.—Used by little children when asking for water.

Sesewan.—This word is used only to little children, to prevent them taking up or eating something dirty, or some forbidden object. The radical *Se*! means “fie!”

Tadjic (*tadjish*).—An exclamation of admiration.

Tata.—Papa, father.

¹ Histoire de la Nouvelle France, 1612. Ed. Tross, pp. 371-395.

In conversing with Odjídjátékha, an educated and intelligent Mohawk from Brantford, Ontario, I learned that the fact of the existence of "child-words" had come under his notice. He was able to remember four only of these:

Gi-ti-ni.—Horse. The ordinary Mohawk word is *ga-nuh-sa*.

O-dji.—An exclamation of fear, fright.

Tata.—Bread. The ordinary word is *ga-na-tah-ro*.

Wa-wa.—Meat. The ordinary word is *O-wa-ra*.

He also mentioned the curious fact that there is some difference between the pronunciation of the men and the women, the former, for example, saying *dota* and the latter *toda*, the consonants being vigorously uttered in each case. The first of the "child-words" in question, *gi-ti-ni*, was, so Odjídjátékha informed me, an invention of his own when a little boy.

Cuoq¹ in his Iroquois Dictionary gives some examples of "child-words" in that dialect. These I have here arranged alphabetically for more explicit reference. He calls attention to the existence of the letters *b*, *p*, and *m* in these words, letters which are entirely foreign to the language of the adult Iroquois.

Aa.—Used with sense of French *caca*.

Ah.—Something dirty or bad tasting.

Aia.—Hurt. Same signification as French *bobo*.

Atsio.—Signifies heat and burns, cold, chilblains, etc. (Le chaud et les brûlures, le froid et les engelures).

Ba.—Expresses the action of kissing, etc. (baiser, embrasser).

En.—Expresses approval, consent, obedience.

Enh.—Expresses refusal, rejection, repulsion.

Fa.—Expresses a disagreeable odor.

Iaiaa.—Used to designate fruit with pips, stones (fruits à pépin).

Kak.—Signifies a bite, cut, etc.

Man.—Used when asking for food, drink, etc.

Mants.—Used when asking to be suckled.

Mionts.—Used to name cats.

Oo.—Used when asking to be put in a vehicle, canoe, etc.

Otsih.—Expresses fear produced by the sight of a human being, an animal, etc.

Tataa.—Bread, cake.

Taten.—Used when asking to be taken up and carried in the arms of father or mother.

¹ Lexique de la langue iroquoise. Montréal, 1882, pp. 191-192.

Tsets.—Expresses the idea of goodness, beauty.

Tsiap.—Expresses the idea of a fall into water.

Tsiotsioo.—Used in asking for porridge, broth, and all that is eaten with a spoon.*

Ttsitsii.—Used in pointing out a little mollusk, an insect, a reptile, causing fear.

All these words, Cuoq states, "Are spoken in a peculiar manner, which no writing can perfectly express." The Iroquois and Algonkin dialects here treated of are those spoken by the Indians belonging to those stocks at the Lake of the Two Mountains, Province of Quebec.

There appear to be a few resemblances in the Algonkin and Iroquois "child-words" cited above, viz:

Algonkin: E, enh, nana, tata.

Iroquois: En, enh, man, tota.

The writer does not desire at present to discuss the remoter origin and inter-relation of the "child-words" brought together in this brief essay, but hopes that additions will be made to the data there given from other sources, and that on some future occasion the subject may be discussed in its wider aspects.

PUBLICATIONS RELATING TO PARIS EXPOSITION.—Two volumes relating to the anthropological collections at the Paris Exposition have appeared: "Catalogue Général Officiel. Exposition Retrospective du Travail et des Sciences Anthropologiques, Section i. Anthropologie-Ethnographie. Lille: L. Danel, 1889, 250 p., 8vo.;" and "La Société, L'École et le Laboratoire d'Anthropologie de Paris à l'Exposition Universelle de 1889. Palais des Arts Libéraux. Instruction Publique. Paris: Imprim-Réunies, 1889. 362 p., 8vo." The first named is a part of the official catalogue series, the latter was issued by the three organizations named in the title.

Following the example of the world's fair in 1867 the great exhibition of 1889 organized, in the building on the Champs de Mars called Palais des Arts Libéraux, an "Exposition retrospective de l'histoire du travail." This served as a vestibule to the great collections illustrating the inventions and arts of our own day. The material was separated into five classes: "*Sciences anthropologiques et ethnographiques; Arts libéraux; Arts et métiers; Moyens de transport; Arts militaires.*" This catalogue contains a minute description of the organization and objects included within the first section, namely, anthropologie et ethnologie.

The second-named publication is an excellent history of the scientific bodies of Paris and of their work, as well as a catalogue raisonnée of the anthropological objects shown by them in the Exposition. The participants in this section were the following:

Société d'Anthropologie, founded by Broca in 1858.

Laboratoire d'Anthropologie, founded by Broca in 1867.

École d'Anthropologie, founded by Broca in 1876.

Musée Broca, containing the collections of all the above named and much besides, founded in 1880.

The first three comprise what is called the Institut d'Anthropologie.

The publications of the Société have been the *Bulletins*, Series i, six volumes (1859-1865); Series ii, twelve volumes (1866-1877); Series iii, eleven volumes (1877-1888), and the *Mémoires*, Series i, three volumes; Series ii, four volumes.

Three prizes—prix Godard, prix Broca, and prix Bertillon—are conferred upon the most worthy publications in anthropology in general, in human biology, and in demography, respectively. Worthy of notice in the same connection was the Réunion Lamarck, founded by Paul Nicole and under the presidency of G. de Mortillet. The object of this organization was to bring together the evidences of the great obligation due to their master for the progress of transformism as a doctrine of creation.

Further publications by members of the Institut d'Anthropologie are Bibliothèque des Sciences Contemporaine, 16 volumes; Bibliothèque Anthropologique, 10 volumes, and Dictionnaire des Sciences Anthropologiques.

The committee of the Institut on the Exposition, under the chairmanship of G. de Mortillet, embraced many of the distinguished anthropologists of Paris. The exhibition was supplemental to that described in the former number of the ANTHROPOLOGIST, Jan., 1890, including brain casts, histology of cerebral convolutions, craniology, osteology, splanchnology, myology, anthropogeny, prehistoric anthropology, ethnic mineralogy, ethnography, history of religion and demography.

The exposition of the Société, the Laboratoire and l'École, was made in the pavillon des Arts Libéraux, in the first story of the apartments occupied by the minister of public instruction.

Much of the material exhibited was reclaimed by its owners, but the Musée Broca was greatly enriched by the Exposition.

O. T. MASON.

MYTHOLOGY OF THE MENOMONI INDIANS.

BY W. J. HOFFMAN, M. D.

The following notes on the mythology of the Menomoni Indians of Wisconsin were recently obtained from members of that tribe. During the period of my investigations with them regarding the present status of the Mitā'wīt, or Grand Medicine Society, and its similarity to the corresponding society of the Ojibwas, and by them termed the Midē'wiwin, many facts and traditions were obtained relating to the origin of totems, animals, etc., some of which are presented herewith as literally as possible.

Totems.—It is admitted that originally there was a greater number of totems than at present. The tradition relating to some of them is as follows: When the Great Spirit* made the earth he created also numerous beings termed Manidos or spirits, giving them the forms of animals and birds. Most of the former were malevolent "under-ground beings"—ā-nā'-maq-ki'. The latter consisted of eagles and hawks, known as the Thunderers, a-nā'-māq-ki', chief of which was the invisible thunder, though represented by the Ki-ne'-u", the Golden eagle. When Ki-shā'-manido, the Good Spirit, saw that the bear was still an animal he determined to allow the latter to change his form. The Bear, still known as na-noq'-kě, was pleased at what the Good Spirit was going to grant him, and he was made an Indian, though with a light skin. This took place at mi'-ni-kā'-ni, Menomoni river, near the spot where its waters empty into Green Bay, and at this place, also, the Bear first came out of the ground. He found himself alone, and decided to call to himself ki-né-u", the Eagle, and said: "Eagle, come to me and be my brother." Whereupon the Eagle descended, and also took the form of a human being. While they were considering whom to call upon to join them, they perceived the Beaver approaching. The Beaver requested to be taken into the totem of the Thunderer, but being a woman she was called na-ma'-ku-kiū', Beaver woman, and was adopted as

* Meshā Manido'. This term is not to be understood as implying a belief in one supreme deity. There are several Manidos, each supreme in his own realm, as well as many lesser spirits or deities. The word Ma-she—great,—is also used as a variant.

a younger brother of the Thunderer. [The term younger brother is here employed in a generic sense and not specifically.] The totem of the beaver is at present termed the *po-wāt'-i-nōt'*. Soon thereafter, as the Bear and the Eagle were upon the banks of a river, they saw a stranger, the Sturgeon (*no-mā'-ē*), who was adopted by the Bear as a younger brother and servant. In like manner *o-māsh'-kosh*, the Elk, was accepted by the thunderer as a younger brother and water-carrier.

At another time the Bear was going up the Wisconsin river and, becoming fatigued, sat down to rest. Near by was a waterfall, from beneath which emerged *moq-wē'-o^a*, the Wolf, who approached and asked the Bear why he had wandered to that place. The Bear said that he was on his way to the source of the river, but being fatigued and unable to travel farther, he had come there to rest. At that moment *o-ta'-tshI*, the Crane, was flying by, when the Bear called to him and said: "Crane, carry me to my people, at the head of the river, and I will take you for my younger brother." As the Crane was taking the Bear upon his back the Wolf called out to the Bear, saying: "Bear, take me also as a younger brother, for I am alone." The Bear answered, "Come with me, Wolf, and I will accept you also as my younger brother." This is how the Crane and the Wolf became younger brothers of the Bear; but as *moq-wē'-o^a*, the Wolf, afterwards permitted *ā'-nām*, the Dog, and *ā-bā'-shūsh*, the Deer, to join him, these three are now recognized as a phratry, the Wolf still being entitled to a seat in council upon the north side and with the Bear phratry.

I-nā'-māq-ki, the Big Thunder, lived at Winnebago Lake, near Fond-du-Lac. The Good Spirit made the Thunderers the laborers and to be of benefit to the whole world. When they return from the southwest in the spring they bring the rains which make the earth green and cause the plants and trees to grow. If it were not for the Thunderers the earth would become parched, and the grass burnt. The Good Spirit also gave to the Thunderers corn, the kind known as squaw corn, which grows on small stalks and has ears of various colors.

The Thunderers were also the fire-makers, having first received it from *Manabūsh*, who had stolen it from an old man who dwelt upon an island in the middle of a great lake.

The Thunderers decided to visit the Bear village at *Minikā'ni*, and when they arrived at that place they asked the Bear to join

them, promising to give corn and fire in return for rice (which was the property of the Bear) and sturgeon, which abounded in the waters of Miniká'ni. The Bear family agreed to this, and since that time the two families have lived together. The Bear family occupies the east side of the council, while the Thunderers sit in the west. The latter are the war chiefs and have charge of the lighting of the fire.

The Wolf came from moq-wā'-ô o-shi'-pi-o-mě—"Wolf his creek."

The Dog, â-nām', was born at no'-mā-wiq'-ki-to—Sturgeon Bay—and joined the Wolf. The â-bā'-shūsh, Deer, came from sha-wa'-no ni-pě'-she, Southern Lake, and together with the Dog joined the Wolf at Menomoni river.

After this union the Bear built a long wigwam, extending north and south, and a fire was kindled by the Thunderers in the middle. From this all the families receive fire, which is carried to them by one of the Thunderers, and when the people travel the Thunderers go on ahead to a camping place and start the fire to be used by all.

The totems or gentes as they exist at this day are as follows, arranged in their respective phratries and in order of importance, viz :—

I. The o-wa'-shě wi-di-shi'-an-un, or Bear phratry :

O-wa'-shě	Bear.
Ki-tā'-mi ^a	Porcupine.
Miq-kā'-nô	Turtle.
O-ta-tshi'	Crane.
Moq-wē'-ô ^a	Wolf.
Mi-kēk'	Otter.
No-mā'-e ^a	Sturgeon.
Na-kū'-tī	Sun Fish.

Although the Wolf is recognized as a member of the above phratry, his true position is at the head of the third.

II. The I-nā'-māq-ki wi-di-shi'-an-un, or Big Thunder phratry :

Ki-nē'-ū ^v	Golden Eagle.
Sha-wa'-na-ni'	Fork-Tailed Hawk.
Pi-nāsh'-i ^a	Bald Eagle.
O-pash'-ko-shi	Turkey Buzzard.
Pa-kāsh'-tshe-kē ^a	Swift-Flying Hawk.
Pě-ki'-ke-ku'-nē	Winter Hawk. Remains all winter in Wisconsin.

Ke-shé'-wa-tó'-shě	Sparrow Hawk.
Maq-kwo'-ka-nī	Red-Tailed Hawk.
Ka-kā'-kě	Raven.
I-naq'-tik	Crow.
Pi-wāt'-i-nōt'	Beaver (former name, No- mā-l').
O-māsh-kōsh	Elk.
U-na'-wa-nīnk	Pine Squirrel.

III. The moq-wē'-o^a wi-di-shī'-an-un, or Wolf phratry, consists of the following :

Moq-wē'-o ^a	Wolf.
A-nām'	Dog.
A-bā'-shūsh	Deer.

The presence of some of the totems in the preceding phratries will be accounted for in the following traditions :

After the several totems congregated and united into an organized body for mutual benefit they still were without the means of providing themselves with food, excepting that above mentioned, medicinal plants and the power to ward off disease and death.

When the Good Spirit beheld the people upon the new earth and found them afflicted with hardships and disease and exposed to constant annoyance from the malevolent underground spirits, the â-nā'-maq-kī^a, he concluded to provide them with the means of bettering their condition, and accomplished it by sending down to the earth one of his companion spirits, named Manabūsh. This is explained in the following tradition, called "The Story of Manabūsh," or

Mā'-na-būsh'-A'-ta-nō'-quen.

There was an old woman named Nokómis, who had an unmarried daughter. The daughter gave birth to twin boys, one of whom died, as did also the mother. Nokómis then wrapped the living child in soft, dry grass, laid it upon the ground at the extreme end of her wigwam, and placed over it a wooden bowl to protect it. She then took the body of her daughter and the other grandchild and buried them at some distance from her habitation. When she returned to the wigwam she sat down and mourned for four days ; but at the expiration of the fourth day she heard a slight noise within the wigwam, which she soon found to come from the wooden bowl.

The bowl moved, and then she suddenly remembered that her living grandchild had been put under it. Upon removing the bowl she beheld a little white rabbit with quivering ears, and upon taking it up said, "Oh! my dear little rabbit, my Manabūsh." She cherished it, and it grew. One day the rabbit sat up on its haunches and hopped slowly across the floor of the wigwam, which caused the earth to tremble. Then the â-nâ'-maq-ki', or bad spirits beneath the earth, said to one another, "What has happened? A great Manido is born somewhere," and they immediately began to devise means to destroy Manabūsh.

When Manabūsh grew to be a young man he thought it time to prepare himself to assist his uncles, the people, to better their condition. He then said to Nokómis, "Grandmother, make for me two sticks, that I may be able to sing." [These sticks, pa'-ka-hěk'-a-nak, are used as drumsticks in keeping time when singing songs of a sacred character.] Nokómis made the sticks for Manabush, when he left the wigwam and selected an open, flat surface, where he built a "long house" or wigwam. He then began to sing, calling his uncles together, and told them that he would give them the Mitā', so that they could cure disease. He gave them plants for food, so that they should no longer want for anything. He gave them medicine bags made of the skins of the mink, the weasel, the black rattlesnake, the missasauga rattlesnake, and the panther. Into each of these he put samples of all the medicines, and taught their use. Manabūsh lived for many years after this and taught his uncles how to do many useful things.

The word Manabūsh comes from Ma'-shě, great, and Wabōsh', rabbit, and signifies "Great Rabbit," because he was to perform great deeds. The ceremony which took place when Manabūsh conferred upon his uncles the power of using medicines in curing disease and in warding off death is now performed annually at the initiation of members into the Mitā'wit, or Grand Medicine Society.

Ma'-shě-no'-mak, The Great Fish.

The people were much distressed by a water-monster, or giant fish, which frequently caught fishermen, dragged them into the lake and there devoured them. So Manabūsh asked his grandmother to hand to him his singing-sticks, and told her he was going to allow himself to be swallowed, that he might be enabled to destroy the

monster. So Manabūsh built a small raft and floated out upon the lake, singing all the while, "Ma'-shē-no'-mak, come and eat me, you will feel good." Then the monster Ma'shē-no'-mak, saw that it was Manabush, and told his children to swallow him. When one of the young of Ma'-shē-no'-mak darted forward to swallow Manabush, the latter said, "I want Ma'-shē-no'-mak to swallow me." This made the monster so angry that he swallowed Manabūsh, whereupon the latter became unconscious. When Manabūsh recovered, he found himself in company with his brothers. He saw the Bear, the Deer, the Porcupine, the Raven, the Pine squirrel, and many others. He inquired of them how they came to meet with such misfortune, and was very sad to find that other kinsmen also were lying dead.

Then Manabūsh prepared to sing the war song, during which it is customary to state the object of making the attack and the manner in which it is to be attempted.

He told his brothers to dance with him, and all joined in singing. The Pine squirrel had a voice unlike the rest, and hopped around rapidly, singing sēk'-sēk' sēk'-sēk, which amused the rest even in their distress. As the dancers passed around the interior of the monster it made him reel, and when Manabūsh danced past his heart he thrust his knife toward it, which caused the monster to have a convulsion. Thus Manabūsh thrust his knife three times toward the monster's heart, after which he said to the monster, "Swim toward my wigwam," and immediately after Manabūsh thrust his knife into the heart, which caused the monster's body to quake and roll so violently that every one became unconscious. How long they remained in this condition they knew not, but upon returning to consciousness Manabūsh found everything motionless and silent. He knew then that the monster was dead, and that his body was lying either upon the shore or upon the bottom of the lake. To make sure, he crawled over the bodies of his brothers to a point where he could cut an opening through the monster's body. When he had cut a small opening he saw bright daylight; then he immediately closed the hole, took his singing sticks and began to sing:

Kē'-sik-in-nā'-mīn, kē'-sik-in-nā'-mīn.

I see the sky, I see the sky.

As Manabūsh continued to sing, his brothers recovered. The Squirrel was the one who hopped around, singing the words sēk'-sēk' sēk'-sek', sēk'-sek' sek'-sek. When the dance was concluded, Manabūsh cut a large opening in the monster's belly, through

which they emerged. As the survivors were about to separate to go to their respective wigwams they all complimented the pine squirrel upon his fine voice, and Manabūsh said to him, "My younger brother, you will also be happy, as you have a good voice." Thus Manabūsh destroyed Ma'-shē-no'-mak.

Manabūsh and his Brother.

When Manabūsh had accomplished the works for which the Good Spirit sent him down to the earth, he went far away and built his wigwam on the northeast shore of a large lake, where he took up his abode. As he was alone, the good manidos concluded to give him for a companion his twin brother, whom they brought to life and called na'-pa-tē', which signifies an expert marksman. He was formed like a human being, but, being a manido, could assume the shape of a Wolf, in which form he hunted for food. Manabūsh was aware of the anger of the bad manidos who dwelt beneath the earth, the ā-nā'-miq-ki', and warned his brother, the Wolf, never to return home by crossing the lake, but always to go around it by the shore. Once, after the Wolf had been hunting all day long, he found himself directly opposite his wigwam, and being tired concluded to cross the lake. He had not gone half way across when the ice broke, the Wolf was seized by the bad manidos and destroyed.

Manabūsh at once knew what had befallen his brother, and in his distress mourned for four days. Every time that Manabūsh sighed the earth trembled, which caused the hills and ridges to form upon its surface. Then the shade of Moqwē'o", the Wolf, appeared before Manabūsh and, knowing that his brother could not be restored to him, Manabūsh told him to follow the path of the setting sun and there become the chief of the shadows in the hereafter, where all would meet. Manabūsh then secreted himself in a large rock near Mackinaw.

Here his uncles, the people, for many years visited Manabūsh, and they always built a long lodge, the me-tā'-wīt, where they sang. So when Manabūsh did not wish to see them in his human form he appeared to them in the form of a little white rabbit with trembling ears, just as he had first appeared to Nokómis.

The Origin of the Ball Game.

Manabūsh wanted to discover and destroy those of the ā-nā'-maq-ki', or underground evil manidos, who were instrumental in the death

of his brother, the Wolf. He therefore instituted the ball game, and asked the Thunderers to come and play against the â-nâ'-maq-ki' as their opponents, after which the game should be the property of the Thunderers. The Ki-nê'-û', Golden Eagle, came in response to this invitation and brought with him the ball. He was accompanied by all the other Thunderers, his brothers and younger brothers. Then the â-nâ'-maq-ki' began to come out of the ground, the first two to appear being the head chiefs—one a powerful silvery white bear, the other having a gray coat. These were followed by their brothers and younger brothers.

The place selected by Manabûsh for a ball-ground was near a large sand-bar on a great lake not far from where Mackinaw is now located. Adjoining the sand-bar was a large grove of trees, in the midst of which was a clearing, smooth and covered with grass. At one end of this clearing was a knoll, which was taken possession of by the bear chiefs, from which point they could watch the progress of the game. Then the â-nâ'-maq-ki' placed themselves on one side of the ball-ground, while the Thunderers took the other, each of the latter selecting a player from among their opponents, as the players always go by pairs.

After the game was started Manabûsh approached the grove of trees, and while cautiously following a stream which led near to the knoll he discovered an Indian painting himself. While watching the process Manabûsh saw the Indian take clay, spread it upon his hands, and then scratching off some with the finger-nails, so that the remainder appeared like parallel stripes, the hands were then slapped upon the shoulders, arms, and the sides of the body. Then Manabûsh said to the Indian, "Who are you and what are you doing?" to which the Indian replied in the Ottawa tongue, "I am Ke-ta'-ki-bi'-hôt and I am dressing myself to play ball. Do you not see they are going to have a great time out there upon the ball-ground? Come and join the game." "No," said Manabûsh, "I will not play, but look on."

[Ke-ta'-ki-bi'-hôt in the Menomoni language is Ke-ta'-ki-bi-hit, and signifies "the striped one." His modern name is Na-kû'ti, the Sun-Fish.]

Manabûsh watched Nakûti as he went upon the ball-field, and saw that he paired himself with u-na'-wa-nink', the pine squirrel of the Thunderers. Manabûsh then continued towards the knoll to see who were his chief enemies. When he had gone as near as possible

without being seen he climbed a large tree, from which he had a good view of the progress of the game, and upon looking at the knoll he saw the two bear chiefs lying there quietly, also watching the ball game.

The game lasted all day without either side gaining any advantage, and when the sun was setting the players returned to their wigwams.

At night Manabūsh descended from the tree in which he had been sitting, approached the knoll, and stood upon a spot between the places which had been occupied by the bear chiefs. He then said, "I want to be a pine tree, cut off half way between the ground and the top, with two strong branches reaching over the places upon which the bear chiefs lie down." Being a *manido*, he immediately became a tree, as he desired. When the players returned next morning to resume the ball game, the bear chiefs and the other *â-nâ'-miq-ki'* said, "This tree was not standing here yesterday;" but the Thunderers all replied that it had been there. Then a discussion followed, during which the two sets of players retired to their respective sides, and the game was thus postponed for a while. The bear chiefs concluded that the tree must be Manabūsh, and they at once decided to destroy him. So they sent for the Grizzly Bear to come to their assistance, and asked him to climb the tree, to tear the bark from the trunk, and to scratch his throat and face. When the Grizzly Bear had torn the bark from the trunk, bitten the branches, and had scratched the top of the trunk at a point where the head and neck of a human being would be, he gave it up and descended. The bear chiefs then called upon a monster serpent, which was lying in the brush close by, and asked it to bite and strangle the tree. The serpent wrapped itself around the trunk and tightened its coils until Manabūsh was almost strangled, although he was able to endure the bites which the serpent inflicted upon his head, neck, and arms. Before Manabūsh became entirely unconscious it uncoiled and glided down. The Bear Kings then believed that the tree was not Manabūsh, so they lay down near the trunk and caused the game to begin. After a long and furious struggle the ball was carried so far from the starting point that the bear chiefs were left entirely alone, when in an instant Manabūsh drew an arrow from the quiver hanging at his side, shot one into the body of the silvery-white bear chief, and another into the body of the gray bear chief. Then Manabūsh resumed his human form and ran for the sand-bar. He had not pro-

ceeded far, however, when the defeated â-nâ'-maq-ki' returned, saw what had happened, and set out in pursuit of Manabûsh. The waters poured out of the ground and followed with such speed that, just as Manabûsh was about being overtaken, he saw ma'-nâ-kwo, the badger, and begged him to help secrete him in the earth. The Badger took Manabûsh down into the earth, and as he burrowed threw the loose dirt behind him, which retarded the waters.

The â-nâ'-maq-ki' could nowhere find Manabûsh; so they gave up the pursuit, and just as the waters were sinking into the depths of the burrow, Manabûsh and the Badger returned to the surface.

When the â-nâ'-maq-ki' returned to the ball-ground they took up their wounded chiefs and carried them home, erecting at a short distance from camp a sick-lodge, in which the wounded were attended by a Mitä', Shaman. Fearing that Manabûsh might return to complete his work of destroying the two bear chiefs, the â-nâ'-maq-ki' began the erection of a net-work of strands of basswood, which was to enclose the entire sick-lodge. When Manabûsh came near the camp of the â-nâ'-maq-ki' he met an old woman carrying a bundle of basswood bark upon her back and asked her, "Grand-mother, what have you upon your back?" The old woman replied, "You are Manabûsh and wish to kill me." "No," he replied, "I am not Manabûsh, for if I were Manabûsh I should have killed you at once, without asking you a question." So, having quieted the old woman's fears, she began to relate to Manabûsh all of the troubles which had befallen the â-nâ'-maq-ki', and said, "We have built a net-work of strands of basswood bark around the wigwam in which the bear chiefs are lying sick; so that if Manabûsh should come to kill them he would have to cut his way through it, which would cause it, to shake when the â-nâ'-maq-ki' would discover and kill him. We have only a little more of the net-work to make, when it will be complete." The old woman also told Manabûsh that she herself was the Metä' who attended to the two chiefs, and that no other person was permitted to enter the wigwam.

When Manabûsh heard all this he struck the old woman and killed her, after which he removed her skin and got into it himself, took the bundle of basswood bark upon his back, and in this disguise passed undetected into the sick-lodge. Here he found the two bear chiefs with the arrow-shafts still protruding from their bodies. Manabûsh then took hold of the shaft of the arrow protruding from the body of the silvery-white bear chief and, thrusting it deeper into

the wound, killed him. Then he killed the gray bear chief in the same way, after which he skinned both bodies, dressed the skins, and rolled them into a bundle. When Manabūsh was ready to depart he went out of the wigwam through the opening left by the old woman, and when he reached the extreme outside end of the network he shook it violently to let the â-nâ'-maq-ki' know that he had been there and had accomplished the destruction of his chief enemies. The â-nâ'-maq-ki' at once pursued Manabūsh, as did also the waters, which flowed out of the earth at many places. Manabūsh, fearing to be overtaken, at once ascended the highest mountain in view, the waters closely pursuing him. Upon the summit he found a gigantic pine tree, which he climbed to the very top. The waters soon reached him, and then he called out to the tree to grow twice its height, which it did; but soon the waters were again at his feet, when he again caused the tree to grow twice its original height. In time the waters rose to where Manabūsh was perched, and he again caused the tree to grow twice its original height, to which in time the waters again made their way. A fourth time Manabūsh caused the tree to grow, and for the fourth time the water rose up until it reached his arm-pits. Then Manabūsh called to the Good Spirit for help, saying that as he had been sent to the earth he begged for help against the anger of the â-nâ'-maq-ki'.

The Good Spirit caused the waters to cease their pursuit, and then Manabūsh looked around him and found only small animals struggling in the water, seeking for a foothold, which was nowhere visible.

Presently Manabūsh observed the otter, and he called to him and said, "Otter, come to me and be my brother; dive down into the water and bring up some earth, that I may make a new world." The Otter dived down into the water, where he remained for a long time; but when he returned to the surface Manabūsh saw him floating with his belly uppermost, and knew that the Otter was dead. Then Manabūsh looked around and saw the Beaver swimming upon the surface of the water, and said: "Beaver, come to me and be my brother; dive down into the water and bring up some earth, that I may make a new world." The Beaver dived down into the water and tried to reach the bottom. After a long interval Manabūsh saw him floating upon the surface, belly uppermost, and then knew that he too had failed to reach the bottom. Again Manabūsh looked about to see who could accomplish the feat, when he saw the Mink

and said: "Mink, come to me and be my brother; dive down into the water and bring up some earth, that I may make a new world." Then the Mink disappeared beneath the water, where he remained for a long time, and when he reappeared he was floating with his belly uppermost, and Manabūsh knew that the Mink also had perished.

Manabūsh looked about once more and saw only the Muskrat, when he called out and said: "Muskrat, come to me and be my brother; dive down into the water and bring up some earth, that I may make a new world." The Muskrat immediately complied with the wish of Manabūsh and dived down into the water. He remained so long beneath the surface that Manabūsh thought he could not return alive, and when he did come to the surface it was with the belly uppermost. Then Manabūsh took the Muskrat in his hands and found adhering to the fore paws a minute quantity of earth. Then Manabūsh held the muskrat up, blew upon him, and restored him to life. Then Manabūsh rubbed between his palms the particle of earth and scattered it broadcast, when the new earth was formed and trees appeared. Then Manabūsh thanked the Muskrat and told him his people should always be numerous, and have enough to eat, wherever he should choose to live.

Then Manabūsh found the Badger, to whom he gave the skin of the gray bear chief, which he wears to this day, retaining the skin of the silvery-white bear chief for his own use.

The Origin of Fire and the Canoe.

Manabūsh, when he was still a youth, once said to his grandmother Nokómis, "Grandmother, it is cold here and we have no fire; let me go and get some." Nokómis endeavored to dissuade him from such a perilous undertaking, but he insisted upon it; so he made a canoe of bark, and, once more assuming the form of a Rabbit, started toward the east, across a large body of water, where dwelt an old man who had fire. As the Rabbit approached the island it was still night; so he went on shore and traveled along until he came in sight of the sacred wigwam of the old man. This old man had two daughters, who, when they emerged from the sacred wigwam, saw a little Rabbit, wet and cold, and carefully taking it up they carried it into the sacred wigwam, where they set it down near the fire to warm.

The Rabbit was permitted to remain near the fire while the girls went about the sacred wigwam to attend to their duties. The Rabbit then hopped a little nearer toward the fire, to endeavor to grasp a coal, but as he moved the earth shook and disturbed the old man, who was slumbering. The old man said, "My daughters, what causes this disturbance?" The daughters said it was nothing; that they were only trying to dry and warm a poor little rabbit which they had found. When the two girls were again occupied, the Rabbit grasped a stick of burning wood and ran with all speed toward the place where he had left his canoe, closely pursued by the girls and the old man. The Rabbit reached his canoe in safety and pushed off, hastening with all speed toward his grandmother's home. The velocity of the canoe caused such a current of air that the fire-brand began to burn fiercely; so by the time he reached shore Nokómis, who had been awaiting the Rabbit's return, saw that sparks of fire had burned his skin in various places. She immediately took the fire from him, and then dressed his wounds, after which they soon healed. The Thunderers received the fire from Nokómis, and have had the care of it ever since.

Ka-ku'-e-ne', the Jumper, and the Origin of Tobacco.

One day Manabúsh was passing by a high mountain, when he perceived a delightful odor, which seemed to come from a crevice in the cliffs. Upon going closer he found the mountain inhabited by a Giant, who was known to be the keeper of the tobacco. Manabúsh then went to the mouth of a cavern and entered. Following a passage which led down into the very center of the mountain, he found a large chamber occupied by the Giant, who asked him in a very stern manner what he wanted. Manabúsh replied that he had come for some tobacco, but was told that he would have to come again in one year from that time, as the spirits had just been there for their smoke, and that ceremony occurred but once a year. Manabúsh, upon looking around the chamber, observed great quantities of bags filled with tobacco, one of which he snatched and darted out of the mountain, closely pursued by the Giant. Manabúsh took to the mountain tops and leaped from peak to peak, but the giant followed so rapidly that when Manabúsh finally came to a peak, the opposite of which presented a high vertical cliff, he suddenly lay down flat upon the rocks, while the Giant leaped over him and down into the

chasm beyond. The Giant was much bruised, but managed to climb up the face of the cliff until he almost reached the summit, where he hung, as his finger-nails had all worn off. Then Manabūsh grasped the giant by the back, drew him up and threw him violently to the ground and said, "For your meanness you shall become Ka-ku'-e-ne", the Jumper (or grasshopper), and you shall be known by your stained mouth. You shall become the pest of those who raise tobacco."

Then Manabūsh took the tobacco and divided it amongst his brothers and younger brothers, giving to each some of the seed, that they might never be without the means of having this plant for their use and enjoyment.

Manabūsh and the Birds.

While Manabūsh was once walking along a lake shore, tired and hungry, he observed a long narrow sand bar, which extended far out into the water, all around which were myriads of water fowl. Then Manabūsh decided to secure a feast. He had with him only his medicine bag; so he re-entered the brush and hung it upon a tree, now called "Manabūsh Tree," and procured a quantity of bark, which he rolled into a bundle, took it upon his back, returned to the shore, and there, slowly walking along in sight of the birds, pretended to pass on. Some of the swans and ducks moved away from the shore, having recognized Manabush and being afraid of him.

One of the swans called out, "Ho! Manabūsh, where are you going?" He replied, "I am going to have a song. As you may see, I have all my songs with me." Manabūsh then called out to the birds, "Come to me, my brothers, and let us sing and dance." The birds assented and returned to the shore, when all retreated a short distance away from the lake to an open space where they could dance. Then Manabūsh put his bundle of bark down upon the ground, got out his singing sticks, and said to the birds: "Now, all of you dance around me as I drum; sing as loudly as you can, and keep your eyes closed. The first one to open his eyes will forever have them red and sore." Then Manabūsh began to beat time upon his bundle of bark, while the birds, with eyes closed, began to circle around him, singing as loud as they could. Beating time with one hand, Manabūsh suddenly caught a swan by the neck and

broke it; but before he had killed the bird it screamed out, where-upon Manabūsh said, "That is right, brothers, sing as loud as you can." Then another swan fell a victim; then a goose, and so on until the number was greatly reduced. Then the "hell diver" (grebe *sp.* ?) opened his eyes to see why there was less singing than at first, and beheld Manabūsh and the heap of victims, when he cried out, "Manabūsh is killing us! Manabūsh is killing us!" and immediately ran for the water, followed by the remainder of the other birds.

As the "hell diver" was a poor runner, Manabūsh soon caught up with him, and said, "I won't kill you, but you shall always have red eyes, and be the laughing-stock of all the birds," and with that gave him a kick which sent him far out into the lake, and knocked off his tail, so that he looked just as he does at this day.

Manabūsh then gathered up the birds and taking them out upon the sand-bar, there buried the bodies, some with their heads protruding, others with the feet sticking out of the sand, when he built a fire that the bodies might be thoroughly cooked. As this would require some time, and as Manabūsh was tired after all his exertions, he decided to lie down and sleep; so, to be informed if any one approached, he slapped his thigh and said, "You watch the birds and awaken me if any one should come near them;" then lying down with his back to the fire, he fell asleep.

After a while a party of Indians came along in their canoes and, seeing the feast in store, went to the sand-bar and took out every bird which Manabūsh had so carefully deposited, but put back the heads and feet, so that nothing remained upon the surface to indicate that the bodies had been disturbed. When the Indians had feasted they left, taking with them all that remained.

Some time after Manabūsh awoke, and, being very hungry, went to enjoy the fruits of his stratagem. Upon attempting to pull a baked swan out of the sand he found nothing but the head and neck, which he held in his hand; then he tried another and found the body of that gone also. He met with disappointment in every instance. But who could have robbed him? Then he struck his thigh and asked, "Who has been here to rob me of my feast. Did I not command you to watch while I slept?" His thigh responded, "I also fell asleep, as I was very tired; but I see some people moving rapidly away in their canoes, and think they were the thieves. I see they are very dirty and poorly dressed." Then Manabūsh ran

out to the point of the sand-bar and beheld the people in their canoes, just disappearing around a point of land ; then he called to them and reviled them, calling them "Win'nibē'go! Winnibē'go!"

This is how the Menomoni have ever since designated their thievish neighbors.

THE "WHIZZING-STICK" OR "BULL-ROARER" ON THE WEST COAST OF AFRICA.—Governor Maloney, of Lagos (west coast of Africa), in his article on the Melodies of the People of West Africa, describes the ceremonial use of this well-known object, particularly among the Egbas (people of Abbeokuta) (Journal of the Manchester Geographical Society, Vol. 5, p. 293). * * * "The *Oro* drums * * * are used with the *Oro* stick to proclaim meetings of the *Oro* Society * * * convened for the trial of public offenders, for the consideration of State questions, etc. Here a description of *Oro* may not be out of place. It represents the active embodiment of the civil power, its mysterious head or idol. It has been interpreted as the executive of the State deified. The *Oro* stick, by which proclamation also takes place, is comprised of a stick resembling the handle of a whip, from the thin end of which is suspended, by means of a piece of string of some native fibre, a flat, thin tongue-shaped piece of wood about five inches long and two inches broad.

"The Egbas (Yorubas) resort pre-eminently to this practice, and when '*Oro is out*' all women, under pain of death, are obliged to remain shut up in their homes. The greatest reverence is extended to this instrument. I have seen even persons professing to be Christians awe-struck in its presence. By means of the handle of the *Oro* stick the tongue is given a rapid circular motion in the air, and this causes a weird noise, not unlike that we hear on stormy nights when the wind is playing down the chimneys. When such a noise is heard *Oro* is said to be out."

This instrument is thus one of the most solemn ceremony, as has been observed among the Australians and other savages. Curiously enough, among the Eskimos of northwestern Alaska, where the "whizzing-stick" is common, it is as purely a child's toy as it is among civilized people.

JOHN MURDOCH.

NOTES ON THE COSUMNES TRIBES OF CALIFORNIA.

BY JAMES MOONEY.

The following notes respecting the Cosumnes of California were obtained from Col. Z. A. Rice, of Atlanta, Georgia, who went to California in 1850 and spent several years in the immediate vicinity of the tribe, which formerly lived in the Sacramento basin, but is now practically extinct, having melted away like snow before the pitiless onset of the gold-hunter.

The Indians went almost naked, dressing being reserved for festive and ceremonial occasions. They were very fond of nose and ear rings, shell and stone beads, and paint. Their houses were of bark, sometimes thatched with grass and covered with earth. The bark was loosened from the trees by repeated blows with stone hatchets, the latter having the head fastened to the handle by means of deer sinews. Their ordinary weapons were bows and stone (chert) tipped arrows. The women made finely woven, conical baskets of grass, the smaller ones being used to hold water, while a larger kind was slung upon the back by means of a band pressing over the forehead, and was used in gathering seeds and grasshoppers. Like most Indians they were very fond of dogs, and there was always a large pack of yelping mongrel curs at every rancheria or hanging on the outskirts at dance gatherings and other public meetings.

Their food included almost everything—from pine nuts to clover tops and from grizzly bears to grasshoppers. They were fond of the nutritious seeds of the nut pine, which on this account was known as the “digger pine” by the miners. As the trunks of these trees are frequently without branches to a height of thirty or forty feet from the ground, the Indians ascended them by means of spliced poles long enough to reach to the first limbs. The pole was held in place by Indians on the ground, while an expert climber ascended and beat off the pine cones with a short pole. In the clover season, when the meadows were bright with pink and white blossoms, whole rancherias went out literally to graze, and the Indians might be seen lying prone in the herbage, masticating the clover tops like so many cattle. Wild oats also were abundant, and likewise were eaten raw.

Another herb, known to the miners as "wild collard," was boiled and eaten as greens. The mode of boiling was peculiar and closely resembles the method best known from its practice by the Assiniboinis. A hole was dug in the the earth and plastered on the inside with wet clay, so as to form a rude kind of pot. Into this the herbs were put and covered with water, which was carried to the spot in grass-woven baskets. Next a fire was built and stones heated, which were then dipped quickly into a basket of water to remove the ashes, and put into the pot. In a few moments the water boiled and the mess was cooked.

The grasshopper hunt was a great event in Digger society, and was conducted in a very systematic manner. A whole settlement would turn out and begin operations by starting a number of small fires at regular intervals in a circle through the woods, guiding the flame by raking up the pine needles, and stamping out the fire when it spread too far. When the fires burned out there was left a narrow strip of bare ground enclosing a circular area of several acres, within which the game was confined. A large fire was then kindled at a point inside of the circle, taking advantage of the direction of the wind, and allowed to spread unchecked. The men, armed with bows and arrows and accompanied by their dogs, kept to the windward in front of the fire and shot down the rabbits and other small animals as the heat drove them from cover, while the women, with their conical baskets on their backs, followed up the fire to gather up the grasshoppers, which merely had their wings singed by the fire, but were not killed. As a squaw picked up a hopper she crushed its head between her thumb and finger to kill it, and then tossed it over her shoulder into the basket.

When the hunt was over, a hole about two feet deep was dug in the earth and filled with bark, which was then set on fire. When the heat was most intense the coals were raked out and the grasshoppers thrown in and thus roasted. Colonel Rice has even seen the Indians eat the grasshoppers alive, merely taking the precaution to pull off the rough legs, which might have a tendency to tickle the throat. Quails, fish, and squirrels were also roasted whole, although the fastidious savage always dipped them in water to remove the ashes and cool the meats before beginning his meal.

Their amusements were dancing, foot-ball, and card games, the latter adopted from the whites. In 1851 the natives on Dry creek, near Fiddletown, held a great dance. In its general features the

performance, which seemed to be some kind of a war dance, resembled Indian dances all over the continent. It was held in the open air, when the ground was parched and dry from long drouth—the dancers, men and women, moving around in a circle singing monotonous chants, occasionally varied by a chorus of yells. The men carried bows and arrows in their hands, while the women wore rattles of terrapin shells upon their legs. These shells were filled with pebbles and fastened upon a strip of fur which was belted on at the knee and ankle precisely like those which the writer has seen worn by the Cherokees, excepting that on the Cosumnes and Moquelumne rivers the shells were arranged in a single row instead of in a square pattern. In the slower movements of the dance the terrapin rattles make no sound, but when the women stamp the noise sounds like that of buckshot falling into a tin pan. The orchestral accompaniment was of the most primitive sort. Some of the performers simply carried a couple of sticks which they struck together, keeping time with the chorus. The drum was a half section of a hollow log, placed on the ground with the convex side up, while several stout fellows in moccasined feet stood upon it and stamped in unison with the general din. As the ground was dry and the dancers circled round and round in the same path, singing, yelling, and stamping, clouds of dust rose and settled upon their faces and bodies, while the streams of perspiration, trickling down in furrows through the paint and dirt, made them look like so many devils.

The dance, of course, was a religious ceremonial, and during its progress my informant noticed two Indians, a man and his wife, sitting a short distance apart from the dancers, rocking their bodies from side to side and uttering low piteous moans, while the tears streamed down their faces and their whole manner betokened the most abject grief. On questioning an interpreter it was found that their only child was lying at home dangerously ill; that they had exhausted every remedy and performed every rite known to the shamans without avail, and now, as a last resort, they had come here to weep and pray until the sun went down that their loved one might not be taken away from them. It was the one touch that brought red and white alike to the level of a common humanity.

Their foot-ball game was more properly a foot-race.* Two parallel tracks were laid off and each party had its own ball. Two

* See account of Zufi Foot-Race p. 225.

athletic young fellows, representing the two contending parties, took their stand at one end, each with a ball on the ground in front of him, and at the signal each kicks it along his respective track towards the goal. All along the line were stationed relays of players, whose duty it was to assist in getting the ball through. It was a rough-and-tumble game to see who should kick the ball, for no one was allowed to touch it with his hand. Two posts were put up at each end of the track and the ball must be driven between these posts. Betting was heavy, the stakes being Indian trinkets of all kinds, and judges and stake-holders presided with a great deal of dignity. The score was kept by means of an even number of short sticks, and as each player drove the ball home he drew out one of the sticks, and so on until the game was won. It was a very exciting play and aroused as much interest as does a horse race among the whites.

Their principal deity seemed to be the sun, and the women had a ceremony somewhat resembling the sun dance of the upper Missouri tribes. The petitioner took her position at daybreak, sitting upon the ground, with eyes intently fixed upon the sun, and tears streaming down her cheeks. She continued to send up prayers and lamentations all day, turning her body with the sun until it sank below the western hills in the evening.

The dead were buried in the earth, although farther south, beyond the Moquelumne river, among tribes of different linguistic stock, instances of scaffold burial were observed. The women, as was natural, were the most demonstrative in their grief. On the death of a relative they cut off their hair and smeared their faces with pine pitch and soot. For months after the funeral they paid periodic visits to the grave, lamenting as if over a new bereavement, while they placed offerings of beads upon the grave and poured libations of water upon the green turf.

THE GREENLANDERS.—*Ausland* for January 27, 1890, publishes some observations on the Greenlanders from the journal of a Danish missionary. They contain but little technographical information, but are chiefly interesting for the view they give of the relations between the missionary and his converts in regard to the old heathen customs, such as witchcraft, blood-feud, etc. (*Die Grönländer. Nach dem tagebuch eines missionars aus dem Dänischen.* *Ausland*, Vol. 63, p. 66-71.)

JOHN MURDOCH.

INDIAN PERSONAL NAMES.

BY J. OWEN DORSEY.

At the Ann Arbor meeting of this Association, in 1885, it was the writer's privilege to read a paper on the subject of Indian Personal Names. This was published in full in Vol. 34 of the Proceedings. A letter from Professor Chamberlin, of Toronto, induced the writer to undertake the preparation of an extensive monograph on the same subject, which will be published by the Bureau of Ethnology.

There will be six lists, in which the Indian names will precede their English meanings: Winnebago, consisting of 380 names; Iowa, Oto, and Missouri, of 506 names; Kwapa, of 15; Osage, of 470; Kansa, of 593; and Omaha and Ponka, of 1,182, making a total of 3,146 names gained by the writer from members of the tribes mentioned. All these tribes have their gentes named after animals.

It is the wish of the writer to collate the names of these six lists with those of the Dakota, Assiniboin, and other Siouan tribes, as given in the schedules of the census of 1880. All such names mentioned in this paper are taken from the schedules of that census.

Each of the six lists will have its names in the original Indian, arranged in alphabetical order and numbered consecutively, without regard to the other Indian-English lists. Each Indian-English list will be preceded by an account of the gentes of the tribe or tribes using the names, and a list of abbreviations. In the list itself will be several columns: 1, the number of the personal name; 2, the gens, and sometimes the sub-gens, in which it is found; 3, the animal name, etc., associated with the gens or sub-gens; 4, the sex of the person bearing the name; 5, the name in the original, with its English meaning. Cross-references will be made whenever practicable. Two examples are given of the beginnings of these lists.

Tciwere (Iowa, Oto, and Missouri) List.

Iowa gens.	Oto and Mo. gens.	Animal name.	Sex.	Personal name.
	()		m.	A-he' a-ki-we'-nun, <i>He Goes Running to the Hill.</i> Mary La Flèche said that this was a feminine name.
	Tee.	Eagle, etc.	m.	A-hu' tha-ke, <i>Hard (?) Wings.</i>
	()		m.	A-hu' the'-we, <i>Black Wings.</i>
	P.	Beaver.	m.	A-hu' thi, <i>Yellow Wings.</i>

Winnebago List.

Gens.	Animal name.	Sex.	Personal name.
Wn.	Bird.	f.	A-hu' ki-shi'-ne win'-ke, <i>Young-bird-that-sheds-its-first-feathers-as-it-flaps-its Wings Female.</i>
Wn.	Ditto.	f.	A-hu' ki-pa'ra win'-ke, <i>(Bird with) Wings Spread Female.</i> Said of a young bird just learning to fly.
Wn.-W.	Thunder-bird.	m.	A-hu' man pa'-ka, <i>He who Hits the Ground with his Wings.</i> Refers to a cloud.

In giving the explanations of names, references will be made to the myths. For example, Pasi duba, *Four Peaks*, a masculine name, suggests incidents in several Omaha myths. In the myth of Ha-ghi-ge, He-ga, the Buzzard, tells how he had to pass over *four flat-topped peaks* before he was taken to prescribe for the wounded water-monsters. In the same myth, when Ha-ghi-ge was about to take up the fourth stone to be used in the sweat-bath, he addressed the stone thus: "On the *four peaks*, venerable man, may I come in sight with my young ones!" In the myth of the Bear-girl the four brothers fled with their little sister, and had passed over *four peaks* before the other sister, the Bear-girl, came in sight.

The English-Indian list will contain all of the 3,146 names, arranged in alphabetical order. Some examples are given:

Ancestral (or *Hañga*), *Female*, Han'-ga mi (Kansa).

Han'-ka win (Osage).

Hüñ'-e mi (Tciwere).

Chief, Ga-hi'-ge (Ponka and Omaha).

Ga-hin'-ge (Kansa).

Ka-hi'-ke (Osage and Tciwere).

Female Difficult to be Seen, A-ta tshe-khi mi (Tciwere).

Ha-tsha tshe-khi win-ke (Winnebago).

The writer has found no name in the first or second person, though two names of this character appear in the census schedules. These were probably mistakes of the recorder, or else they were given intentionally by unscrupulous interpreters.

A study of the six lists referred to above, in connection with those of the Santee, Sisseton and Warpeton, Yankton, and Assiniboin, has resulted in the discovery of certain classes of names, such as color names, iron names, whirlwind names, and the names of composite beings.

Color Names.—The writer suspects that some of the color names have a mythical or symbolic meaning. For instance, we find these *Elk names*: White, Black, Spotted, Red, Scarlet, Gray, and Yellow. *Buffalo names*: Black, White (an albino), Yellow, Spotted, and Gray. *Grizzly bear names*: Black, White, Brown or Dark Gray, Gray, Red, and Scarlet. *Wolf names*: Black, White, Gray, Scarlet. *Thunder-bird names*: Black, White, Distant-white, Yellow, Yellowish Brown or Dark Gray, Green or Blue, and Scarlet. *Eagle names*: Black, White, Spotted, Gray, Yellow, Red, and Scarlet. *Hawk names*: White, Black, Brown, Gray, and Red. The Assiniboin have Scarlet Crane and Green Cormorant. The Winnebago have Black, White, Green, and Yellow Snake, the last being the rattlesnake. The Santee have Scarlet Claws, and the Yankton, Scarlet Hoofs. Scarlet Moccasins, Scarlet Tip-end (formerly a Santee name, Inkpa-duta), Scarlet Iron, and Scarlet Hail. The Santee have Scarlet Indian Carriage, Scarlet Medicine, and Scarlet Pine. Scarlet Eyes is a Yankton name. Other Santee names are: Scarlet Dawn, Yellow Dawn, Spotted Sun, Scarlet Night, Black Lightning, Green Star, Scarlet Star, and Green Eggs. Yellow Lightning is a Sisseton and Warpeton name. White-Haired Female, Red-Haired Female, Green-Haired Female, and Yellow-Haired Fe-

male point to the myth of the Badger's Son. In like manner the masculine names corresponding to the four just given recall the myth of the Chief's Son and the Thunderers, the latter being four old men with large heads, one having white hair, one red, one green, and one yellow. It is very probable that four of these colors—black or red, white, green or blue, and yellow—are associated in mythology with the four winds, as is the case among the Zúñi, Navajo, and other tribes in the southwest, and the Carolina Cherokee, according to Mr. Mooney, of the Bureau of Ethnology. Among the Omaha, according to Mr. Francis La Flèche, red is the color symbolizing the east. In "Omaha Sociology" the writer has given a sketch of the tent of A-ga-ha-wa-shu-she, an Omaha. It will be found as Plate XXXI in the Annual Report of the Bureau of Ethnology for 1882. On the tent are four parallel zigzag lines, of different colors, evidently representing four kinds of lightning. The owner of the tent was a member of the Black Bear people, who united with the Elk people in the worship of the thunder.

Iron Names.—Maza, in Dakota; ma^{zě}, in Omaha, Ponka, and Kansa; manse, in Osage; manthe, in Tciwere, and maza-rā or mas, in Winnebago, are now translated "iron" or "metal." But can that be the true rendering in any or all of the following names? It is very improbable. The writer must confess his ignorance of the archaic meaning of the term. Up to the present time he has found the following "Iron" names, though there may be others: Ate oye maza, was rendered "Father Iron Track" by the census enumerator, under the notion that *ate* always means "father;" but there is another "ate," a synonym of "ato," *to become green or blue on*, so this name may mean "Track Becomes Blue on it;" Bad Iron; Buffalo Bull with Iron Horns; Climbs Iron; Comes Home and Stands after Naming Iron; Distant-white Iron Female; Female who Carries Iron home; Female who Dwells-in Iron; Female who Jumps-on Iron; Female who Knocks-down Iron; Female who Opens Iron; Female who Sits Viewing Iron; Female who Smokes Iron (in a pipe); Four Iron Female; Good Iron Female; Growing Iron; Half Iron; Her Bare Iron; Her Good Iron Female; Her Iron Pipe Female; His Iron Bow; His Rattling Iron (His Bell, Tamaza-hdahda); Iron; Iron Appears; Iron Bar; Iron Blanket Female; Iron Boulder; Iron Buffalo; Iron Cedar; Iron Claws; Iron Claws Female; Iron Cloud; Iron Coming out in the same place Female; Iron Day; Iron Dog; Iron Door; Iron Door

Female ; Iron Elk ; Iron Eyes (of an eagle) ; Iron Eyes (of an elk) ; Iron Female ; Iron Guardian Spirit ; Iron Hawk ; Iron Hawk Female ; Iron Head ; Iron Heart ; Iron Hoop ; Iron Horn ; Iron in the Face ; Iron Is-returning Crying-aloud ; Iron Kills-them ; Iron Leggings ; Iron Legs ; Iron Lightning ; Iron Lightning Female ; Iron Lodge ; Iron Lodge Female ; Iron Lying In-sight ; Iron Man (or Iron Indian) ; Iron Mane ; Iron Nation ; Iron Necklace ; Iron Night Female ; Iron Preparing-herself Female ; Iron Quill-feathers ; Iron Road ; Iron Road Female ; Iron Second-son ; Iron Shield ; Iron Shirt ; Iron Star ; Iron Star Female ; Iron Striking-itself ; Iron Tracks or Iron Trail ; Iron Tracks Female ; Iron Thunderbird ; Iron Tusk ; Iron Upon-her Female ; Iron Voice ; Iron Walks Crying-aloud ; Iron Whip ; Iron Wind ; Iron Wings ; Female who Kicks-a-hole-in Iron ; Makes Iron sound with his foot (by kicking, jumping, etc.) ; Mazahuha naji^a, probably, Standing Iron Legs ; Ma^a-ze-da^a, an archaic Omaha name, masculine, apparently refers to *ma^a-ze*, now rendered, iron ; Ma^a-ze wa-ji^a, meaning not gained, an archaic feminine Ponka name ; Female who Named Iron ; Noisy Iron ; Female who Plays with Iron ; Rattling Iron Female ; *rattling* here is *sna*, not *hdahda* ; Returning Iron ; Revolving Iron ; Running Iron ; Sending Iron ; Shows Iron ; Sliding Iron Female ; Small Iron Eagle ; Small Iron Mallard ; Small Iron Wings ; Soft (?) Iron ; Spotted Iron ; Standing White Iron ; Sweet-Smelling Iron Female ; Taps the Iron ; Thrown Iron Female ; Turns Iron ; Two Iron Female ; Walks-on Iron ; Female who Walks-on Iron ; Wings with Iron in the middle ; Woman with Iron Hair ; Yellow Iron (brass?).

Whirlwind Names.—Face Whirlwind ; Gray Whirlwind ; Gray Whirlwind Female ; Grizzly-Bear Whirlwind ; Scarlet Whirlwind.

Nation or Oyate Names of the Dakota.—Female who made the Nation ; Good Nation ; Her Mysterious Nation ; His Large Nation ; His Nation ; Iron Nation ; Rattling Nation ; Scarlet Nation.

Tunkan or Stone-God Names of the Santee Dakota.—Beautiful Tunkan ; Female who Hears the Tunkan ; Female who Prays-to the Tunkan ; Female who Rattles the Tunkan ; Female who shakes the Tunkan often ; Female who Steps-on the Tunkan ; Female Stepped-on by the Tunkan ; Four-cornered Tunkan Female ; Many Tunkan ; Moving Tunkan Female ; Mysterious Tunkan ; Plays-on the Tunkan ; Singing Tunkan ; Tunkan Comes Rattling and Lies-down Female ; Tunkan Man (*i. e.*, Tunkan Indian man) ; Tunkan Moving-itself Female.

Thunder-being Names.—Eagle Thunder-being ; Hawk Thunder-being ; Pigeon Thunder-being ; Buffalo-bull Thunder-being ; Grizzly bear Thunder-being ; Fire Thunder-being ; Left-handed Thunder-being ; Soldier Thunder-being ; Venerable-man Thunder-being. Other Thunder-being names have been given among the color names.

Composite Animal Names.—Crow Dog ; Grizzly-bear Eagle ; Horse Eagle ; Cloud Eagle ; Moon Hawk Female ; Buffalo-bull Eagle ; Male-of-the-Indian-race Eagle, or Man Eagle ; Venerable-man Eagle ; Thunder-being Woman.

Genealogical Tables.—The monograph will end with several genealogical tables of Omaha and Ponka. In each table a few affinities will be represented as well as consanguinities. That of the Real Osage sub-gens of the Ponka tribe contains 191 names, extending through seven generations. Were the writer to prepare a copy of this genealogical table on a scale large enough for exhibition the chart would be forty feet in length. The table illustrates not only the subject of Indian personal names, but also the kinship system and marriage laws of the people ; and the other tables agree with it. For at least six generations a Ponka has been at liberty to marry into any gens excepting those of his parents and grandparents. It has been inferred by some students that at some past time, if not now, the Ponka, Omaha, and their kindred tribes were forbidden to marry into gentes, say, on the same side of the tribal circle, or constituting a common brotherhood or phratry, and that there was a group of gentes from which one was obliged to select his wife ; but the writer finds no traces of such a custom.

Among the questions suggested by this paper is one that deserves careful investigation : Did the Dakota or Sioux ever have animal names for their gentes ? The writer has put the question to several white missionaries, as well as to Indians, and there has been but one answer : " The Dakota have no animal names for their gentes, and no tribal or clan taboo. Each man has his personal taboo. While some Dakota divisions are seemingly named after animal taboos, as Those who eat no dogs, Those who eat no geese, and Those who eat no buffalo, the members of the divisions thus named are not forbidden to eat the dog, goose, or buffalo." But while this is the case at the present day, has there always been such a difference between the Dakota tribes and the others of the same linguistic family ? Who can tell ?

**STONE MONUMENTS IN NORTHWESTERN IOWA AND
SOUTHWESTERN MINNESOTA.**

BY T. H. LEWIS.

In a paper read before the Anthropological Society of Washington, February 5, 1889, I described interesting specimens of certain "stone monuments," which, from the nature of their material and mode of construction, may be termed Boulder Outline figures. Last summer, having occasion to visit the valley of the Big Sioux river and the Coteau des Prairies, to the east of it, I met with a number of these interesting remains of prehistoric times and made full notes of them, of which the following is a concise account:

THE BIG SIOUX VALLEY LOCALITY.—In Lyon county, Iowa, about one and a half miles west of Granite Station, on the north side of the Sioux Falls Branch of the Burlington, Cedar Rapids and Northern railroad, there is a plateau on which is a large group of mounds, which I surveyed on July 29 and 30, 1889. Scattered among these mounds, principally near the center of the group, are many boulder outlines, representing circles and ellipses.

One circle, 34 feet in diameter, has no opening, and the boulders, 111 in number, are laid close together. A portion of the line passes over the base of a mound. Less than 100 feet distant there is another circle, 30 feet in diameter and composed of 67 boulders. There is a small opening on one side about one foot in width, the boulders marking each side of the opening being much larger than any of the others forming the circle. The base of one of the mounds, which is 60 feet in diameter and $5\frac{1}{2}$ feet high, is surrounded by a circle of small boulders, 134 in number, without opening. An elliptical outline, consisting of 167 boulders, is 124 feet in length and 36 feet in width. Near by is another of still larger dimensions, but somewhat irregular in outline.

Some circles join others, in which case at the point where they unite there is but one line of boulders, which completes both circles. At one place there is a group of seven contiguous circles, all of which are connected in this manner. Among the works is a double circle formed by two series of boulders, or one circle within another,

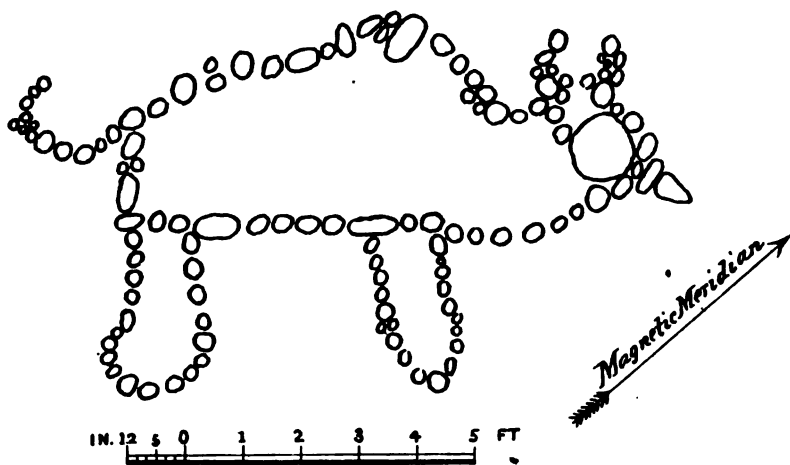
both series being close together. Many of the circles are formed of bowlders weighing from 25 to 60 pounds each, and occasionally there is one that will weigh 100 pounds or more. There are also several circles of small stones, which range from less than two feet to six feet in diameter. In all instances the bowlders are imbedded to a greater or lesser degree in the soil, some being not more than half exposed, while only the tops of others are visible above the surface.

Just south of the railroad track, and opposite the monuments described, there is a large inclosure or fort of the mound-builders' times, with low walls, the surface of which within shows every evidence of former occupancy; but, strange to relate, there is no evidence of boulder circles there. There were some circles outside, but none inside the fort. North of the railroad, less than one mile from the preceding locality, near the edge of a high plateau, there was formerly another group of boulder outlines, many of which have been destroyed. Noticing a few bowlders protruding above the surface and forming the segment of a circle, I procured a pick and shovel and made an investigation in order to ascertain if the remainder of the bowlders could not be accounted for, and the search was not fruitless. I found that about three-quarters of the bowlders, which formed a circle 33 feet in diameter, had sunk beneath the surface or had been covered up by the soil, the depth of which above them varied from one to eight inches.

THE COTEAU DES PRAIRIES LOCALITY.—In the western part of Murray county, Minnesota, there is a series of conspicuous hills, knolls, and ridges, which are irregularly grouped, and the highest points of which rise some 200 feet above the lowest surrounding valleys. That portion of these elevations lying south of the Pipestone branch of the C., St. P., M. & O. R. R. was known to the Indians as Buffalo Ridge, and it still retains the name. The top of this ridge is some two miles in length, running in a general course from northwest to southeast through sections 16 and 21 of township 106, range 43, and finally terminating on all sides in lower spurs and terraces, the base of the whole ridge covering perhaps three square miles.

On the highest knoll there is a series of boulder outlines, mostly formed of small stones. The best preserved of these figures apparently represents a buffalo, as shown in the accompanying diagram. It heads to the northeast, and its greatest length is nearly twelve feet. The horns are nicely rounded and one of them is formed by

a double row of stones. Between the outlines of the head there is a large boulder, about two-thirds of which is exposed and which fills out the head, making it practically solid. Between the outlines of the body there were formerly one large and two smaller boulders which filled the space. The beds or matrices in which they had lain were plainly visible when I made the survey, on August 15, 1889. These three stones had been removed by some of the settlers, probably for building purposes. This figure can scarcely be called an "effigy," but it is so nearly like one that it may be considered



Boulder outline of a Buffalo, Murray Co., Minnesota.

a connecting link between the effigy mounds proper and the boulder outlines; yet there is such a radical difference between the two extremes that a separate classification is a necessity; for, while the first represents one half of an animate object in bass-relief, as it were, and is built solidly of earth, the other is a mere outline formed of stones or boulders.

But a few feet distant from the ends of the Buffalo's legs there are two lines (trails) of small stones $2\frac{1}{2}$ feet asunder and running toward what has apparently been a stone heap or cairn, which is partially demolished. On the same knoll there are parts of three other animals, which, judging from the traces still existing, represented different kinds, the outline of no two being exactly alike. There were two other trails, each with double lines, one being formed with small stones and the other by boulders weighing from four to

ten pounds each. There were also several small circles from one to six feet in diameter, in a good state of preservation, while others that had been partially demolished could still be traced. One of the undisturbed ones was located a short distance northeast of the Buffalo, on the slope of the knoll; it was two feet in diameter, inside measurement, and had an opening five inches in width. The largest stone among those forming this circle was $1\frac{1}{2}$ inches in diameter, while nearly all the others were still smaller. All the stones and boulders forming the figures on this knoll were more or less imbedded in the soil, showing that they were not placed there very recently.

Toward the southeast, at the base of the ridge, about one mile distant, I discovered some new forms in boulder work, which may be called "pavements." These are not large, being only from two to five feet in diameter and composed of boulders weighing from four to eight pounds. Nearly all of these figures are round, but a few are square or nearly so, while occasionally there is one that is irregular in outline. The top surface is as nearly even as it is possible to make such work. In each pavement the boulders are of one size, or nearly so, and they are well bedded in the ground. There are also a few small circles and crescents, generally formed by small stones, and a few boulder trails. These different figures are scattered here and there, scarcely more than three or four being found together.

FORMER NOTICES AND CRITICAL REMARKS.—In the paper referred to, which was printed in the American Anthropologist for April, 1889, I overlooked the fact that the explorer, J. N. Nicollet, who visited southern Minnesota in 1838, made particular mention of such boulder work in his report, printed in 1845.* The first reference is on page 12, as follows:

"One mile from the *Traverse des Sioux*, and on the bank of the river, are the remains of an Indian camp; the circular area of which is still indicated by the heaps of stones around each lodge. As this indicates the existence of a custom no longer in use among the *Ndakotahs*, or Sioux, who have occupied the country for a long time back, it is difficult to assign the true origin of this relic. The Sissitons, the fourth tribe of the *Ndakotahs*, on whose lands these relics are found, have no tradition of them."

* Report intended to illustrate a map of the Hydrographic Basin of the Upper Mississippi River made by J. N. Nicollet, January 11, 1845. Washington, 1845.

Two pages further on, speaking of the evidence to be found of the "erratic deposite" in the shape of fragments of primitive and transition rocks scattered over the Coteau, he says :

"The Sioux take advantage of these loose materials to erect signals on the most elevated spots, or to designate the place by some conical structure, where some exhausted hunter has died on the prairies, and desires to be buried in a more prominent situation ; or they amuse themselves in shaping them into fantastic figures. They give names to these localities, which thus serve as landmarks in a country where there are no other geographical beacons."

Again, on the same page, having described a *wi-wi*, or swamp, situated somewhere between the heads of the *tchan na tam-be* or hidden wood and Okshida creeks, he uses the following words :

"Lastly, by way of illustration to what I have said above of the usages of the Sioux, I may add, that, on the western side of the aforesaid *wi-wi*, and on the most elevated crest of the Coteau, there is a great accumulation of the materials belonging to the erratic deposite, of which they have availed themselves to construct the effigy of a man ; so that the spot is called *tuyan-witchashta-karapi* ; in English, the place where has been built up a man of stone."

On his large map, published in 1842, this particular figure appears marked in the locality described, and is designated "Stone Man." Nicollet does not say that he saw it himself, and his map shows no track to it but indicates a route passing more directly westward from Shetek Lake by the Great Oasis, now Bear Lakes, to the Red Pipestone Quarry. He must have been a little too hasty in forming his opinion when he so readily considered "boulder outlines" to be the work of the Sioux Indians, especially as it may be seen that he held the stone circles at Traverse des Sioux to be much more ancient than the Sioux occupancy of that country.

George Catlin, the painter, had previously visited the Quarry, in 1836, and he apparently saw this effigy on his return thence eastward ; for in his "letter" he declares his intention of seeing the "Stone man medicine," but there is no further reference to it in the book. It may be remarked here that the name he calls it by does not favor the idea that the Sioux gave him to understand that their people had made this monument.

Now, it was this Stone Man that I was most anxious to find last August, but the search was unsuccessful. The probabilities are that it, or rather the boulders composing it, has been carried off by

settlers of the neighborhood, wherever that was. There is no doubt that it was in existence until within a comparatively recent date; for a reliable man, a Mr. Casey, who was connected with the U. S. mail service, told me that he had seen it, and that it was situated somewhere on Buffalo Ridge near the Buffalo.*

There can be no doubt that the Indians used bowlders and stones to hold down the edges of their tents or tepees; and it may be further added that the whites have used bowlders for the same purpose. But the remains of the old Indian camps are not to be taken into consideration in this connection for the following reason: While bowlders have thus undoubtedly been utilized by the Indians, and while they may have formed, in cases, almost a perfect circle when in use, yet on the removal of the tent they would naturally be pushed or thrown to one side, thus destroying the symmetry of the circle. I have seen many Indian camping places where bowlders have been used, but have failed to note a single instance where a regular circle of stones has been left on their abandonment. If the tepee theory be admitted in explanation of the larger circles, how explain the very small ones, in which even a *papoose* would find it difficult to stretch himself at full length?

There is yet need of a great deal of light on the subject of Bowlder outlines.

St. Paul, Minnesota, May 14, 1890.

MUTILATION OF THE TEETH AMONG THE WANYAMURZI.—According to Paul Richard (*Zeitschrift der Gesellschaft für Erdkunde*, Berlin, Vol. 24, p. 256) the Wanyamurzi of Central Africa for a tribal mark break off the inner corner of each of the middle upper incisors. These corners are not filed off, as is usually reported, but split off chip by chip by laying a little iron chisel, the length of the finger, against the tooth and striking it with a little stick. The operation must be very painful, as extremely violent headaches in the back of the head result from it.

JOHN MURDOCH.

* In the winter of 1854-'5 a young man by the name of Northrop, who had lived in the tents of the Dakotas more or less, told a friend of mine (Mr. A. J. H.) about a stone work he had seen on the western prairies, which was shaped like a man. This was most probably the Stone Man of Catlin, Nicollet, and Mr. Casey.

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BOOK NOTICES.

Social History of the Races of Mankind. Third Division: Aoneo-Maranonians. By A. Featherman. London, Trübner & Co., 1889, 8vo., pp. xxiii—480.

This is the latest general treatise on the North American Indians, and in some respects the most pretentious one yet published. The surprising title is composed from a flimsy theory and a euphemized myth. The theory is that all the tribes of the two western continents came from the valley of the Amazon, one of the names of one part of that river being literated as Maranon. The myth, never known in any shape but to a few tribes, is applied to the northern continent by modernization in significance and by violent euphonic changes in expression. So we are requested to use Maranon for all the aborigines of America, and Aoneo for their northern grand division. This is a step beyond Schoolcraft, though in the same direction of imaginary connection and of the manufacture of names by piecing together fragments of words selected from unrelated languages. But Schoolcraft, instead of baptizing the race of the "whole boundless continent," limited himself to the invention of grand-divisional names for the tribes of North America. He called those of the eastern coast, Algic; those west of the Mississippi, Abanic, and the intermediate, Ostic. This was all very pretty; but the coinages of names without recognized etymology and without true definition or substantial authority did not succeed, and perhaps not a dozen persons in the world now recall Schoolcraft's well-intended effort. Dr. Featherman's still more ambitious essay may share the same fate unless it shall be remembered through the ridicule that it occasions.

That author investigated the anthropology of America by spending many months in the Library of Congress at Washington, during which time he read and excerpted much matter from the immense mass of useless "Americana." The absurd title of the book is a sample of its entire contents. It contains no real philosophy or study, but presents a melancholy lesson, showing the result where an honest and industrious but rather dull man writes on a subject about which he is wholly ignorant. Whatever he saw on library shelves, in

print or in manuscript, was of equal value, and he mixed all together *quod lib.* Bancroft, in his "Native Races of the Pacific Coast," did nearly as badly, but with the difference that he gave bibliographic reference to volume and page. If he said of the tribe, e. g. X, that the people were dark, of low stature, cruel, and of small number, and in the same paragraph said of the same tribe that the people were light in color, tall, gentle, and numerous, he at least gave the authorities with precision, so that the reader might have some means of choice. But Dr. Featherman does not give this option. He copies indiscriminately the utterly futile and accidental impressions of voyagers or essayists. Many travelers' tales, intended to be true, are colored by the weather or by digestion, by the accidents of march and by the personal character of men and women with whom there happened to be contact. Therefore the accounts about the same peoples at the same time are often diametrically opposite. The anthropologic surface only is skimmed without study of its depths. Our author, however, selects all the skimmings that chance to please his taste and mixes the result in a farrago without authenticating any of its ingredients by any specific label.

Dr. Featherman was unfortunate in ending his researches before the appearance of the later and more scientific publications on his subject. He stopped his studies and went home across the Atlantic to write. During the last two years, however, he must have informed himself, to some extent at least, in respect to the latest aspects of the topics treated, as he has added a number of foot-notes to his text, and has also injected matter into his preface, which is in Roman pagination and of course was last written, in which ideas appear that are not in accord with the general contents. It is a pity that he had not revised his whole work instead of continuing to reproduce the antiquated authorities with occasional qualifications. Those authorities are, however, not useless in proper hands. But trained students must weigh them and interpret their meaning, which our explorer of the Library of Congress was not able to do.

The author shows no understanding of the only possible classification of the American tribes, viz., that by linguistic stocks and their dialects, and has no knowledge of the priscan habitat and subsequent migrations of those tribes. He took names of tribes in all kinds of shapes, French and Dutch and English, and misprinted forms of mistaken aboriginal sounds, and mixed them together without scientific or logical method, so that the several divisions of a

stock, known to every student as such, appear ~~under~~ some alias, separated by pages and chapters from their congeners, who also appear under an alias. Substantially the same remarks about marriage, mortuary rites—in fact, the whole catalogue of customs—are repeated over and over without discrimination, or are changed without reason. The salt and pepper and the oil and the mustard are cast into the attempted salad but are not amalgamated, and there is no good egg in the dressing. No new or useful idea can be gleaned from these five hundred pages, but on the contrary there are many more reproduced or original errors than pages. This would be of more serious consequence if the general arrangement and presentation of the volume were not so repulsive and the cost so considerable as to insure that its readers will be few and their indoctrination slight.

The North American Indians are in themselves of little historical importance, but the study of their customs and religions is of the greatest importance in illustrating the stages and phases by which mankind has advanced toward and into civilization. All concerning them should, therefore, be stated with elaborate care as a basis for the most useful chapter that can now be written in the general theme of the author's series of volumes, viz., the Social History of the Races of Mankind. But as presented in the present volume the Aoneo-Maranonians, who by any other name would smell as sweet, have never existed. The study of the Flying Islanders of Peter Wilkins would be a work of as great scientific value as that before us. Indeed, the story of Wilkins would be of greater use, because imagination that succeeds in verisimilitude is nearly as good as facts; but Dr. Featherman appears to possess neither accuracy nor imagination.

GARRICK MALLERY.

Die Forschungsreise S. M. S. "Gazelle" in den Jahren 1874 bis 1876 unter Kommando des Kapitäns zur See Freiherrn von Schleinitz, herausgegeben von dem Hydrographischen Amt des Reichs-Marine-Amtes. I. Theil. Der Reisebericht. Mit 58 Tafeln. Berlin, 1889.

The German exploring expedition in the ship *Gazelle*, which went to Kerguelen Island to observe the transit of Venus in 1874, crossed, during its voyage of nearly two years, more than 100 degrees of latitude, accomplished the circumnavigation of the globe,

and landed on many shores. It was equipped with a corps of learned investigators, whose observations included a wide range in science.

It is only in the ethnography and anthropology in general that we are now interested. These subjects are included in the first part of the report and occupy about 60 of the 317 quarto pages which constitute the volume. The periods of sojourn on inhabited shores were usually brief; the natives encountered were often timid, distrustful, or inimical—sometimes they fled at sight of the Europeans and could with difficulty be induced to approach the latter. Under such circumstances the opportunities for study were necessarily very limited, and the observers are to be congratulated on having obtained even as much information as they here present to us.

The subjects mostly touched on are the physical and moral characters of the people, their external appearance, houses, boats, domestic animals, food, employments, dress, weapons, tools, and ornaments. There are some valuable observations on their social condition and religion. The natives of MacCluer Gulf, New Guinea, we are told, profess Mohammedanism, yet the explorers did not fail to observe abundant evidence of the survival of an earlier cult among them. In other places, as New Mecklenburg and New Hannover, grotesque masks and images were collected which probably pertained to religious ceremonies.

A village was visited in MacCluer Gulf where all arrows and spears were pointed with wood or bone, and no weapons of iron were seen. In New Mecklenburg (New Ireland) and New Pomerania (New Britain) people were visited who still made fire by rubbing two sticks together.

Anthropology is better represented in the illustrations than in the text; 26 full-page lithographic pictures (some colored) out of the 58 plates which embellish the work are devoted to it. They depict groups of men, individuals, dwellings, anomalous crania, weapons, images, and other articles.

WASHINGTON MATTHEWS.

The Oregon Trade Language or "Chinook Jargon," by Horatio Hale, M. A., F. R. S. C., London: Whittaker & Co., 1890.

Just now, when so much attention is paid to the invention of international languages, the above little book by Mr. Hale will prove a welcome addition to the general knowledge and literature of the

subject. The Chinook Jargon is an apt illustration of the old adage "necessity is the mother of invention." It was not only invented, if the term is admissible, to supply a want, but has fully answered its purpose and has had a career which is much more than history is likely to record of some later linguistic aspirants for fame. The Chinook Trade Jargon is not the only example of its kind. Pigeon English, as it is called, has served a similar purpose in China and to a less extent in western America, as also did the *Lingua Franca* of the Mediterranean.

Long before the days of the advent of the European upon its banks, the Columbia river formed a sort of highway for aboriginal trade. The Chinooks held all the lower course of the river from the Dalles to the mouth, including its best fishery shores, and to the Dalles every year resorted the interior tribes to fish, to gamble, and to trade. The tribes thus visiting the banks of the river spoke many languages and dialects, which represented a number of distinct linguistic families. These tribes, though differing less in habits than in language, still offered many peculiarities. Through their yearly gatherings on the territory of the Chinooks the interior tribes all doubtless acquired a smattering of their language; but the Chinook, or better the "Trade Jargon," which, as Mr. Hale shows, became a thoroughly international language, owes its existence to a later period and to the necessities and influence of the European fur-trader. As in early times the neighborhood of Nootka Sound formed the rendezvous for the trading ships, the language spoken here came to be more or less employed by the traders. Later, trading ships entered the Columbia, and Astoria became the head center of the fur trade, and it was natural that when an inter-tribal speech became necessary, the Chinook tongue should form its basis, both because the Chinook was the language most familiar to the Europeans and because it was probably better understood by neighboring tribes than any other.

Thus we find, according to Mr. Hale's analysis, that the Trade Jargon is composed of 111 Chinook words, 18 Nootka, 41 English, and 34 French. In addition, 10 words were formed by onomatopoeia and about 38 are doubtful. The resulting 252 words constitute a very small vocabulary, one would think, for the purposes intended; but no phenomenon of speech is more remarkable than the small number of words that can be made to suffice for every-day topics. The vocabulary thus formed and added to as time went on

was provided with a few simple grammatic rules, and the hybrid language thus curiously constituted was ready to play its part in the drama of trade and colonization.

Its usefulness has been very great. For nearly a hundred years it has sufficed for all the exigencies of European trade with the natives and for an inter-tribal communication which has extended far beyond the center where the Jargon originated. It has served as the means of conversion to at least a nominal Christianity of a large number of the Indians of this region, and still it maintains its usefulness and is likely to do so for a long period to come.

The author of the present volume, who was the first to bring the Trade Jargon to scientific notice, presents a succinct account of its origin and history, gives its rules of grammar, furnishes specimens of hymns and sermons by missionaries, and adds a Trade-English and English-Trade vocabulary. We thus have what amounts to a complete treatise of this interesting speech, sufficient for the needs of the missionary and traveler as well as for the student of language in its broader aspects.

H. W. HENSHAW.

Dr. Friedrich S. Krauss, Volksglaube und religiöser Brauch der Südslaven. Vorwiegend nach eigenen Ermittlungen. Münster (Westphalia), 1890. Aschendorff, publisher. 8vo., pp. xvi, 176.

This book upon the religious ideas of the Southern Slavs is pre-eminently of a critical nature, and criticism is never so well applied as when the history of religions, whether monotheistic or polytheistic, is to be investigated. The well-known author is a Jewish scientist of the most advanced type, and his long investigations of the Slavic folk-lore failed to bring him into accord with the ideas regarding the Slavic deities as set forth by his fellow-authors on the same subject. He states in the preface that the hypothesis of a primeval Slavic nation, speaking only *one language* and possessed of *one religious belief*, is absolutely untenable and has brought confusion and discredit upon ethnologic science. In the opinion of our author, many incontestable facts which have come to light forbid us to assume for the present Slavic nations physical descent from a single people, who must be supposed upon this theory to have subsequently differentiated into dialectic groups. It would be far easier to prove the existence of a European-Asiatic primitive religion than of a

primitive religion of the Slavs, or of the Germans or Finns. The ancient epoch of Slavic belief, so replete with idealistic divine worship and with the odor of the most innocent and lamb-like purity of mind, which is said to have been destroyed by the influence of the Germans and of Christianity, never existed. It was merely the elucubration of some excited and patriotic mythologists of the Russian, Bohemian, and South Slavic "persuasion."

In conformity with these principles and others of like tendency, the author's method is entirely inductive. He starts from and admits only what he or others have actually observed in the songs, traditions, and customs of the respective Slavic provinces. In the descriptions of the manners, customs, and superstitions of the Slavic people, whether they be of an esthetic or coarse character, Krauss is a faithful portrayeur and perfectly familiar with what he describes. The belief in witches is much stronger among the Slavs than in any of our "most catholic" countries, and many of the instances mentioned by Krauss would be profoundly ludicrous if they did not excite in us a still more profound feeling of compassion for the ignorance of humanity. The Vilas of the Southern Slavs are a peculiar sort of ghostlike women somewhat comparable to our fairies. They have been often described in recent publications and Krauss defines them (p. 69) as "ripened souls of trees, acting chiefly outside their tree-homes." His "Pestfrauen" (pestiferous women) are anthropomorphisms of wood-spirits or forest-fairies, the miasmatic effluvia from the woods and thickets bottled up in human forms.

From the following headings readers may obtain a glimpse of the rich ethnologic contents of the book: Sun, moon, stars; the man and the spinning woman in the moon; spirits of fate, virgins representing fate; gifts of the tree-souls; spirits of the deceased inhabiting trees; imprecations and conjuring formulæ; spirit of the mountain; witchcraft for milk and butter; Vilas the friends of horses; oaths and bets of Vilas; insanity caused by Vilas; Vilas in the clouds; their visibility. Meeting places of witches; their tools of witchery and effects upon the weather. Mortuary superstitions. Candles made from human fat; sacrifices of all sorts. Immuration of living animals. Prophecy from omoplates, etc.

It is impossible to do justice to a book of so extensive learning and research within the compass of a review. The attention of the reader having been directed to it he may safely be left to judge for himself.

ALBERT S. GATSCHET.

NOTES AND NEWS.

IROQUOIAN MYTHOLOGIC NOTES.—In Iroquoian legendary and mythologic lore the most characteristic and remarkable heroes and heroines belong to a peculiar class. The Onondaga name for them is *te-ha-no-ä'-to'* for a male, and *te-ye-no-ä'-to'* for a female; while *ra'-tir'-här* for a male, and *ä'-tir'-här* for a female, are Tuskarora designations. The Tuskarora not infrequently use as substitutes for the last-mentioned terms, *nä-ru-nur'-hä'r* for a male, and *nä-yä-nur'-hä'r* for a female.

The Great Father and Mother of the race were of this class, although they were born and reared above cloud-land and on the upper side of the sky, thus showing that the ideas respecting these beings originated in remote antiquity. The etymology of these several terms appears to have been lost with the custom of which they are severally the names. Only conjectural and unsatisfactory reasons for the custom could be obtained by the writer from those who used them in the many legends and myths which he has collected in the past few years.

Before attempting to assign an etymology to the foregoing denotive terms, the striking features of the mode of life peculiar to the class of persons of which they are the names will be given.

A person assigned to this class (which appears to have been very small in number in every community) was most studiously "secreted" or "concealed" from the eyes of all persons, either in their own home or in that of some one near of kin, who lived alone and secluded. No one, with the exception of one or two of the blood relations of the person so "concealed," was ever allowed to see him or her. To this end, the "secreted" person was forced to lie in bed and to remain covered from head to foot, night and day, except when eating or attending to other necessities. An appropriate diet was also prescribed. Seclusion began with the earliest infancy and before any of the natural capacities of the child had developed sufficiently to reveal anything regarding the gifts and powers of the future man or woman. This seems to indicate that some prodigy attending the birth of the child was the criterion by which an infant was adjudged to be born into this class in question. At the appearance of the age of puberty the "secreted" person

was "mature," and could then enter into the enterprises for which his conjectured supernatural gifts fitted him. The data at hand for arriving at any definite conclusions in regard to the origin of this custom are meagre and undecisive.

The etymologies of the Tuskaroran terms *nā-ru-nur-hā'r* and *ra'-tir-hār* seem to point quite clearly to the rare and unusual fact of a child "born with a caul." The verb stems in both words, *-hā'r* and *-hār*, are both from one and the same root, *-hār* to "lay upon, put upon;" hence, in the perfect tense used with a present tense signification, it means to "have on, wear, or bear." The nominal stems *-nur-* and *-'tir-* of the two words seem to be closely connected with the stem *-tār-*, for a *t* and an *n* are permutable in the languages of the Iroquois. The stem *-tār-* is the base of the word *u-tār'-ē*; "spawn, placenta, caul, etc., etc." The nominal part *-nur-* is the base of the word *u-nur'-ē*, a plait or braid of husks, being evidently connected with *u-tur'-ē*, a "husk" or "sheath." The stem *-'tir-* is the base of *u-'tir'-ē*, which means at present "parturitive moaning," but originally the same as *u-tār'-ē*. So that if the foregoing identifications be correct the words *nā-ru-nur'-hā'r* and *ra'-tir'-hār* signified originally "he-has-on-caul." The fact that nature had "covered" differently from others the child so born would probably lead to the custom of keeping it covered after birth.

J. N. B. HEWITT.

A COLLECTION OF STONE IMPLEMENTS FROM THE DISTRICT OF COLUMBIA.—Mr. S. V. Proudfit has presented to the Smithsonian Institution his entire collection of stone implements from the District of Columbia, and on April 15, 1890, he read before the Anthropological Society a paper submitted with the donation.

The collection is fairly typical of aboriginal handicraft as it is now found in the fields of the District, and includes axes, both grooved and ungrooved, polished and rough; arrow-heads, knives and scrapers, unfinished implements, chips and flakes from workshops and village sites, pottery, and soapstone vessels. Each piece was catalogued when collected, and a full descriptive catalogue accompanies the collection, together with a map showing the fields from which the relics were obtained.

The paper touches upon the conditions attendant upon the distribution of these remains in the Potomac valley, and considers at

some length questions bearing upon the relative antiquity of the chipped pebble-work from the workshops and elsewhere, with the conclusion that it belongs to the same period of culture that is represented in the historic Indian village sites of the District.

DRUM-TELEGRAPH OF THE CAMEROON NATIVES.—Das Ausland for February, 1889, *et seq.* has a very interesting article by Robert Müller on "Life and Occupations in the Cameroon," in which a curious instrument is thus described: A log is hollowed out and is divided along the transverse diameter by a bridge, upon which a drumstick is beaten to produce sounds of different tones. This rather unpromising musical instrument becomes of great importance as a means of communication, and may, in fact, be called a "drum-telegraph." The villages are situated comparatively close together, and by means of the drum news is communicated rapidly from one village to another. A regular drum-language has been invented, and this can be imitated with the mouth or beaten on the breast, so that conversation can be carried on by the natives in the presence of white men without the latter understanding it, though comprehending the spoken language. The drum also serves the ordinary purpose of an instrument to dance by, etc.

H. W. HENSHAW.

A MODIFICATION OF BROCA'S STEREOGRAPH.—Broca's stereograph is one of the most convenient instruments for making geometrical drawings of crania. It has, however, the disadvantage of being not quite exact on account of lack of stability of the frame and of looseness of its numerous joints. The principle underlying the construction of this instrument is very simple: A steel point which is kept vertically on a drawing board is made to follow the outlines and sutures of a cranium. The steel point is attached to a cast-iron frame, the opposite end of which carries a pencil, forming exactly the continuation of the axis of the steel point. When the steel point follows the outlines of the cranium the pencil draws a geometrical projection of the same lines. In Broca's instrument the drawing board stands vertically and consequently the steel point must be held horizontally, which requires a rather complicated arrangement for suspending and adjusting the frame holding the

point. By placing the drawing board horizontally this difficulty may be overcome, and the apparatus is not only more exact, but at the same time far less expensive. It may be described as a combination of Broca's stereograph and of Von Cohausen's craniograph, which latter instrument seems to have hardly ever been used. It consists of a large drawing board spanned by a brass bridge which is placed about three inches above the board. The strip of brass forming the bridge rests on two pieces of wood that are screwed to the sides of the board. The bridge carries the cranium. The drawing apparatus corresponds exactly to that of Broca's stereograph. The cast-iron frames, carrying the steel point and the pencil, are, however, attached to a heavy iron foot board which slides on four feet on the drawing board. It will be seen at once that all the objections to Broca's instrument arising from the looseness of its joints and the instability of its frame are thus overcome. Experiments made with the modified form of the instrument in the anthropological laboratory of Clark University have given very satisfactory results. The cranium is held in place on the bridge by means of lumps of clay, which serve also for adjusting it in the desired position. A slight modification of the same instrument may be used for studies of the endocranium. The steel point which is used for tracing the outlines of the cranium is removed. A horizontal steel point may be attached to the vertical arm of the drawing frame. Its point is exactly vertical above the pencil. This horizontal arm is introduced into the foramen magnum and touches the endocranium. The anterior end of the point is curved so that it can touch all points of the sagittal and of transversal cross sections of the skull. By following the surface of the endocranium the pencil will draw the outline of the same. Thus drawings of sections of the skull in any plane crossing the foramen magnum may be obtained.

F. BOAS.

PRIMITIVE GAMES.—Under this title, Mr. Everard F. im Thurn, the well-known ethnologist of British Guiana, gives (in *Timehri*, v. 3, n. s. pt. 2, Dec., 1889) a very interesting account of the games of the Indians of Guiana, based on his own observations. The paper is too long for reproduction, even in abstract. It will be found to well repay reading by those interested in the subject of games.

JOHN MURDOCH.

SACRED STONE ENCLOSURE OF THE FIJIANS.—A full and detailed account of the "Nanga of Viti-Leva" is given by Adolph B. Joske in *Internationales Archiv für Ethnographie* (V. 2, pt. 6, 1889, pp. 254-271). These curious stone enclosures, which were used for the celebration of rites similar to those of the Australian Bora and probably connected with the club or secret society found through all Melanesia, and called the Dukduk, were only discovered a few years ago, when the Rev. Lorimer Fison, a Wesleyan missionary, succeeded in getting a tolerably good account of its structure and of the rites connected with it. Mr. Joske had the good fortune to see three of these *Nanga* (or "beds"), though in ruined condition, and obtained from the older natives detailed descriptions of the Nanga rites.

The Nanga ceremonies were practiced only in a certain limited region in Viti-Leva, and were kept up as late as 1876 by the Kaithols, or highlanders, who at that date were subjugated by the British government. "With their subjugation everything was swept away which tended to keep alive the memory of old tradition. The lotu (Christianity) was professed by all, the ways of the coast tribes were adopted, and old fashions discarded, good and bad alike."

It is fortunate that such careful observers have succeeded in rescuing so much information about this remarkable association which is of great interest in connection with the secret societies which are continually being discovered among savages elsewhere.

JOHN MURDOCH.

ELEPHANT MOUND.—In an article in Transactions of the Wisconsin Academy of Sciences, Arts, and Letters (1889) Mr. Peet discusses the so-called "Elephant Mounds." He finds that the present condition of the original elephant mound is such as not to permit accurate measurements. His examination, however, convinced him that the proboscis attributed to the figure, upon which has chiefly rested its identification as an elephant, is due to washing of the sandy soil. The same conclusion had been reached previously by Professor Thomas from an examination and surveys made by assistants of the Bureau of Ethnology. Professor Thomas believes that the effigy in question was intended for a bear. Mr. Peet's conclusion with reference to other so-called elephant mounds examined by him is that they represent bears or bison.

H. W. HENSHAW.

EASTERN NEW GUINEA.—“The natives of St. Aigran do not appear to have any religious belief, nor to have troubled their heads about a future state. The interpreter told me that it was quite possible that white men existed somewhere after death, but that his people certainly did not. Their belief in the supernatural is confined to witchcraft, and the idea that no one can die except from the spells of some wizard of a hostile tribe is the cause of most of their wars. The dead are buried, but the head is sometimes afterwards exhumed and placed in a stone cairn. . . . Polygamy is allowed, but is not common. The usual price for a wife is a stone hatchet, shell ear-rings, and three pigs, which, although nearly as much as would be paid for the life of a warrior, is not exorbitant, considering that a wife cuts wood, draws water, and even plants the food on which her husband is to subsist.” (Basil Thompson, “Narration of an exploring expedition to the eastern part of New Guinea,” *Scottish Geographical Magazine*, vol. 5, no. 10, Oct., 1889, pp. 513-527.)

JOHN MURDOCH.

LANGUAGE OF THE MOSETENA INDIANS OF BOLIVIA.—M. Lucien Adam publishes (*Revue de Linguistique*, July, 1889) some grammatical notes on the language of this little tribe of Indians, who live near the headwaters of the River Beni, among the mountains of Central Bolivia. These notes are chiefly based on a sort of catechism published in 1834 by a Spanish missionary, Father Andres Herrero, in connection with vocabularies published in 1883 in the *Kansas City Review* by Mr. Edwin R. Heath. M. Adam states that the language is not related to any of the known Bolivian languages.

JOHN MURDOCH.

WEST AFRICAN MUSIC.—The governor of the British colony of Lagos, on the west coast of Africa, has just published an excellent article entitled “On the Melodies of the Volof, Mandingo, Ewe, Yoruba, and Houssa people of West Africa,” in the number of the *Journal of the Manchester Geographical Society* issued in March, 1890 (vol. 5, nos. 7-9). In this he gives twenty-two musical scores with words, and an interesting account of the occasions on which these songs are sung and of the musical instruments used.

JOHN MURDOCH.

THE WANYAMUESI.—Paul Reichard concludes his interesting account of these people in No. 5 of the last volume of *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* (v. 24, 1889, pp. 304-331). In this article he describes the occupations and amusements of the little girls, having dealt with the boys in the preceding article, and then goes on to treat at length of the mental and moral characteristics of the people, their clothing, and ornaments. Particularly noticeable under the last head is his account of the sufferings the women endure in fitting on the tight armlets and anklets of twisted hair or metal. He then describes their daily occupations, their food, and the methods of preparing it, and closes with an account of the use of narcotics, tobacco, and hemp. The article is a model of ethnographic description and is written in a clear and entertaining style.

JOHN MURDOCH.

THE AMERICAN INDIANS.—Dr. Eugène Verrin has published a short paper on the American Indians ("Quelques notes ethnologiques et ethnographiques sur les Indiens de l'Amerique, Bull. Soc. d'Ethnographie, April, 1888, pp. 102-106). He accounts for the mesaticephalic skull of most of the Indians of the present time as the effect of the admixture with an originally dolicocephalic race of brachycephalic invaders, enumerating as probable admixtures the Canarians or Guanches, the Negroes, the Scandinavians, and the Japanese and Malays. After stating, without question, that the Indians are all rapidly decreasing in numbers, he goes on to mention a number of valuable gifts which civilization owes to the Indians. Among these he instances tobacco, chocolate, logwood, cochineal, arnotto, the tomato, and the potato.

JOHN MURDOCH.

MAYA MANUSCRIPTS.—A. Castaing publishes in the Bulletin de la Société d'ethnographie a review of the work done in deciphering the Maya manuscripts ("La littérature écrite de l'Antiquité Américaine et le déchiffrement des textes hiératiques Mayas," Novembre, 1888, pp. 289-292), beginning with the Landa Manuscript and the work of Brasseur de Bombourg and his followers, who he declares "did not gain the esteem which their efforts solicited." The new school beginning with Léon de Rosny in 1876 has obtained assured and decisive results.

JOHN MURDOCH.

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THE ASCENT OF MAN.*

BY FRANK BAKER.

I think I could turn and live awhile with the animals—they are so placid
and self-contained.

* * * * *

They bring me tokens of myself * * *

I do not know where they got those tokens,

I must have passed that way untold times ago and negligently dropped
them,

Myself moving forward then and now and forever.

Walt Whitman—1855.

The science of anthropology, one of the younger daughters of human knowledge, is so vast in its scope that to master all of its different ramifications seems a hopeless task. Having for its object the comprehensive study of man, including his origin, his development, and his present condition, its aim is to focus and co-ordinate the general results derived from a vast number of subordinate branches. The philologist contributes information concerning the origin and growth of language and its effect upon civilization, the mythologist tells of the psychological side of the human mind and traces the rise and progress of religious ideas, the archæologist, in order to fix their places in the history of mankind, searches for the remains of peoples long since passed away. All these depend for their material upon external records, left by tradition, by writing, by sculpture, or by implements and weapons.

* Address of the Vice-President before the Section of Anthropology, American Association for the Advancement of Science, at the Indianapolis Meeting, August 20, 1890.

With greatest care every habitation of man is searched in order to learn from it the details of the life of its former inhabitants.

Within comparatively recent times still another avenue of information has been found, for we have learned that it is not alone by these external records that man's history can be traced, but that important facts may be obtained by studying the constitution of his body; that the changes and vicissitudes of his existence are recorded on his very bones, in characters long undeciphered but to which the clue has at last been found. My labors have led me more particularly to this department of anthropology, and a concise summary of the main heads of this research may be of value and interest.

The views propounded by Lamarck in the early part of this century, with reference to the modification of living organisms by use and adaptation, have been remarkably confirmed in modern times. Exhaustive researches into the constitution and properties of the cells composing living tissues show that they are subject to continual change, each impulse from without being registered by some small alteration in their physical condition. Impulses of a similar kind continuously acting produce greater changes, and long-continued repetition notably alters even the hardest and most enduring of structures. Thus it is that bones are modified in form by muscular pull, and the surfaces of teeth are shaped by incessant grinding. These alterations are more readily apparent to us because they affect very hard and easily preserved organs, but the effects are equally potent, though not so clearly recognizable, in the softer tissues of the body. Every act of our lives is certainly but surely registered within the marvelous structure of our bodies. Not a muscle can contract without an absolute change in its substance; not a nerve-cell can discharge without some self-destruction.

Most of these changes being very minute and evanescent are quite beyond our power to accurately estimate, and were the increments of change confined to a single lifetime—were each individual to stand only for himself and compelled to earn his experience by the same tedious struggle—use and adaptation would have but little power to mold mankind into races and varieties. But by the action of a law as yet imperfectly understood, the adaptations of each individual are transmitted to its offspring; or, to speak more accurately, the offspring pass through the changes more easily and quickly than the parent did. While each has always to go back to the be-

ginning and commence from the simple blastema of the primitive egg, the younger has the advantage of being able to adapt itself more quickly to its surroundings, provided these have not too greatly changed, and thus starts a little way ahead of its ancestor in the race for life. In consequence of this law changes become cumulative, and a cause acting for a great length of time upon a series of successive generations finally produces a well-marked and easily observed effect in the structure of individuals—changing colors, modifying organs, shaping whole regions of the body.

Again, if, after such changes have been effected, these causes cease to operate and the organs they have shaped are no longer of use, the latter become reduced in size, atrophy and recede, remaining, however, in a vestigial condition for many, many generations as records of the past history of the race, as dolmens and cromlechs certify to former customs and flint arrow-heads and stone hatchets give evidence of a previous state of civilization.

The human body abounds in testimony of this sort—indications of the pathway by which humanity has climbed from darkness to light, from bestiality to civilization—relics of countless ages of struggle, often fierce, bloody, and pitiless.

These are found in every organ of the body, and each new investigation adds to their number. To enumerate them all would be impossible within the limits assigned me by your patience. I will therefore touch only upon a few of the more striking ones, especially those connected with the modifications of the limbs, with the erect position, and with the segmentation of the body.

The limbs, being organs of support and locomotion, show great variations in the zoological series, and the hand of man has long been looked upon as especially significant of his high position in the animal kingdom—one of the chief distinctions between him and the nearest brutes. To a certain extent this is correct. No creature possesses so highly complex and effective an organ for grasping and adjusting objects, and it is pre-eminently this that has made man a tool-using animal. On comparing a human hand with that of the anthropoids it may be seen that this efficiency is produced in two ways—first, increasing the mobility and variety of action of the thumb and fingers; second, reducing the muscles used mainly to assist prolonged grasp, they being no longer necessary to an organ for delicate work requiring constant readjustment. Thus some elements are added and some

taken away. Now, according to the theory I have enunciated, the latest elements ought to show signs of their recent origin—to be somewhat imperfectly differentiated and liable to return to their primitive state, while those going out of active use ought to be vestigial, not equal in size or force to muscular organs generally, very liable to variation or disappearance. This is what actually occurs.

Among the new elements is a special flexor muscle for the thumb arising high up on the fore-arm. A very slight examination shows that this muscle has been split off from the fibres of the deep flexor that bends the terminal joints of the fingers. In most apes the two form a single muscle, and in man the thumb flexor very often shows unmistakable evidence of such origin. In about 10 per cent. of persons part of its fibres pass over and become blended with the parent muscle. Not infrequently I have seen the two entirely united, returning absolutely to their primitive condition. The deep and superficial flexors of the fingers show signs of a similar relationship, as they frequently blend more or less, tending to revert to the type shown in most lower animals. Indeed, if we go back to embryonic life we find all the muscles of the anterior part of the fore-arm united in what is termed the pronato-flexor mass, recalling the original condition of musculature in the earliest animals possessing limbs.

In the category of disappearing muscles comes the palmaris longus, an important aid in climbing and grasping. It takes its origin from the upper arm and passes to the hand, where it expands into a large sheet of thick membrane called the palmar fascia, which splits into several slips passing to each finger. The pull of the muscle acts upon all the fingers together, keeping them bent without independence of action. Now in man the fingers have each two separate flexor tendons that can act to a certain extent independently. To ensure their independence they are, at the wrist, enclosed in a remarkable tubular conduit or subway formed by soldering the palmar fascia to the wrist-bones. This at once destroys any effective action of the palmaris longus on the fingers and it becomes a flexor of the wrist. This soldering undoubtedly took place because the muscle was no longer required as a finger-holder. Like other organs that after playing a considerable part have come from change of habit to be of but little value, it shows the most astonishing tendency to variation. Not a week passes in a large dissecting

room that some curious anomaly is not found in this muscle. Sometimes it is seen almost in its primitive condition, the palmar fascia being comparatively movable and the palmaris longus having some effect upon the flexion of the fingers; oftener it unites wholly or partially with some portion of the pronator-flexor mass or disappears altogether. The disappearance is usually only apparent, however. Regressive structures rarely disappear totally, for on careful search a strip of fascia can usually be found that represents the atrophied and aborted organ.

Since these two examples differ in that the first represents the development of a new muscle while the second is the atrophy of an old one, we ought to find racial differences corresponding to these two conditions. Our studies of racial anatomy are as yet far from sufficient to give us certain information upon these points, and I would especially avoid generalizing upon too meagre data. It has, however, appeared to me that in negroes the palmaris longus is more inclined to assume its primitive type—that is, to be less likely to vary—while the long flexor of the thumb is, on the contrary, more inclined to be partially if not wholly united with the deep flexor of the fingers.

Connected intimately with the hand are the other portions of the thoracic limb that carry it from place to place. Here again we may note many points indicating a progressive development of the member. When the arm is naturally and easily bent at the elbow it does not carry the hand to the shoulder, as might be expected, but towards the mouth. The reason for this is that the articular surfaces of the elbow-joint are not cut horizontally across the axis of the humerus but inclined at an angle of about 20° . This obliquity does not occur in the foetus and is less in Bushmen, Australians, and the anthropoid apes. It is associated with another peculiarity; indeed, may be said to be caused by it. This is a twisting of the humerus on its axis, which occurs markedly in the higher races. If we hold up endwise the humerus of a European we see that the longest diameters of the upper and lower ends very nearly coincide. In the negro we find the lower diameter turned more towards the body; still more in the anthropoid apes, and again more as we descend the scale. Embryology teaches that the humerus was formerly set so that the hollow of the elbow looked backward rather than forward, and it seems, therefore, that, as the functions of the limb became more various, the lower end of the

bone gradually twisted outward around the long axis until its diameter described a considerable arc. This turned the hand with the palm to the front, extended its range and adapted it for a wider usefulness. Greater twist is found in the right humerus than in the left and in the humeri of modern times than in those of the stone age. As the torsion increased some provision became necessary for carrying the hand easily across the body to the mouth. This was effected by the inclination of the trochlear surface of the elbow-joint already adverted to.

Many movements of the arm in man are produced by muscles acting upon the shoulder-blade or scapula. As the hand was turned outward and a wider range given, these increased in extent and importance, and the scapula accordingly widened out at its vertebral border in order to give a more extensive attachment for muscles. In order to accurately estimate this change the ratio of the breadth to the length of the scapula is taken. This ratio, called the scapular index, is highest among the white races, less in the infant, in negroes, and in Australians, and still less in anthropoid apes. It is significant also that the vertebral border of the scapula is the last to form in the foetus. We have, therefore, three modifications—the torsion of the humerus, the inclination of its trochlear surface, and the scapular index—all depending upon each other, all varying together *pari passu*, and all showing a progressive development both in the individual and the race.

Muscle is composed of one of the most highly organized and expensive tissues of the body. Unless fed constantly with a great supply of blood to keep up its active metabolic changes, it quickly wastes, functional activity being absolutely necessary to its proper maintenance, as any one knows who has seen how rapidly the muscles of an athlete diminish when he goes out of training. If from accident or change of habit its use altogether ceases, its protoplasm is gradually removed, its blood-supply diminishes, and it shrinks to a mere band or sheet of fibrous tissue. Changes of function may therefore affect the form of muscles, one portion becoming tendinous or fascia-like; may even cause them to shift their places by inducing a development on one side and an atrophy on another, or to disappear altogether, replaced by fascia or ligament. A similar regression may take place in bone and cartilage, a high grade, actively metabolic tissue, difficult to maintain, being replaced by a low grade one comparatively slow to change. It is,

therefore, not unusual to find that muscles, bones, and cartilages performing important functions in some animals are represented by vestigial structures in those higher in the scale. Our conclusions on this subject are confirmed by finding occasional instances where the hereditary tendency has been greater than usual and the parent form is reproduced more or less completely in the higher animal. The palmar fascia at the distal end of the palmaris longus, to which allusion has been made, represents a former muscular portion, relics of which probably remain as some of the small thumb muscles.

- Another interesting instance is the epitrochleo-anconeus, a small muscle at the elbow-joint, used in apes to effect a lateral movement of the ulna upon the humerus. In man the ulna has become so shaped that the lateral movement is almost totally lost, and the muscle has accordingly degenerated, being represented by a strip of fascia. Very often, however, a few muscular fibres are still found in this situation.

Several minor peculiarities that remind us of primitive conditions occur in the region of the humerus. Occasionally a supra-condyloid process is found throwing a protecting arch over the brachial artery and median nerve; in this resembling the supra-condyloid foramen of marsupials. Struthers found this to be hereditary, occurring in a father and four children. A perforation of the olecranon fossa may probably be regarded as a reversion towards the condition of anthropoid apes. This frequently occurs in South African and other low tribes and in the men of the stone age. Recently Dr. D. S. Lamb has found it remarkably frequent in pre-historic Indian humeri from the Salado Valley, Arizona.

While the region of the hand and fore-arm indicates increased of specialization, the upper part of the limb generally testifies to a regression from a former more highly developed state. The anatomy of the flying apparatus of a bird shows a series of muscular, ligamentous, and bony structures connected with its upper arm far beyond anything ever seen in man. The coracoid bone, a very important element of the shoulder girdle in birds, has become reduced in man to a little vestigial ossicle that about the sixteenth year becomes soldered to the scapula as the coracoid process. The muscles arising from this—pectoralis minor, coraco-brachialis, and biceps—are structures represented in birds by strong, flying muscles. The subclavius, a little slip ending at the clavicle, appears to have formerly passed to the coracoid bone or to the humerus and been

employed in arm movement. The pectoralis major appears to represent what was formerly a series of muscles. All these have a tendency to repeat their past history, and the number of variations found among them is legion. The biceps shows traces of its former complexity by appearing with three, four, or even five heads, by a great variety of insertions, by sending a tendon outside the joint capsule instead of through it, as is the rule. The pectoralis major may break up into several different muscular integers, inserted from the shoulder capsule down to the elbow. The coraco-brachialis shows the same instability, and by its behavior clearly indicates its derivation from a much larger and more extensive muscular sheet.

Not less significant are the ligaments about the shoulder. Many of these appear to be relics of organs found active in animals lower in the scale. Thus the coraco-acromial ligament spanning over the shoulder-joint is probably a former extension of the acromion process; the rhomboid, conoid, trapezoid, and gleno-humeral ligaments represent regressive changes in the subclavius muscle, the coraco-humeral ligament, a former insertion of the pectoralis minor. Bands of the deep cervical fascia alone remain to testify to the former existence of the levator claviculæ, a muscle present in most mammals and used to pull forward the shoulder girdle when walking in a quadrupedal position. In negroes I have frequently found it more or less complete. A fibrous strip uniting the latissimus dorsi to the triceps is all that remains of an important muscle, the dorso-epitrochlearis, passing from the back to the elbow or fore-arm, used by gibbons and other arboreal apes in swinging from branch to branch. Testut found this fully developed in a Bushman. I have myself seen various muscular slips that must represent some portion of it, and authors generally describe it as occurring in 5 or 6 per cent. of individuals.

The hind limbs of apes are popularly thought to be remarkably specialized. The term *quadrumana* or four-handed is used to characterize the class; yet it is quite true that this term involves a false conception. No animal has four exactly similar feet, still less four hands. The feet of the ape differ widely from hands; the great toe is not really opposable like the thumb, but merely separable from the others and differently set, so as to afford a grasp like that of a cramp-iron. The gibbon alone has a small muscle of the foot that may be compared with the opponens of the thumb. That these peculiarities are also shared by man to some extent is also well

known. It is quite possible to train the toes to do a certain kind of prehensile work, even to write, cut paper, and sew. A baby not yet able to walk can often pick up small objects with its toes. Compare the marks caused by muscular action on the sole of a baby's foot with those on the hand, and it will be seen that there are distinct signs of this prehension. Even the opponens hallucis of the gibbon is not infrequently found in man. The foetal condition of the foot also approaches that of the apes, the heel being shorter and the joints so arranged that the sole can be easily turned inward. In the ape the first or great toe is turned backward and outward by shortening its metatarsal bone and setting it obliquely upon the ankle. This shortening and obliquity also occur in the foetus; the adult condition, in which the metatarsal bone is lengthened and set straight so as to give a longer and firmer internal border to the foot, being gradually acquired. Many savage tribes still use the foot for climbing and have a shorter metatarsal, a wider span between the first and second toes, and greater ease in inverting the sole. Connected with this ease of inversion should be mentioned a peculiar, ape-like form of the tibia that occurs in people of the stone age, in the mound-builders, and in some American Indians. This is a flattened, sabre-like condition of the bone known as platycnemy. It is apparently to give greater surface of attachment and resistance to the pull of the tibialis anticus, the principal muscle that turns the sole inward. It is interesting to note that this peculiarity is much more marked in some early human skeletons than in any of the anthropoids.

The poet says that while other animals grovelling regard the earth, Jupiter gave to man an uplifted countenance, and ordered him to look heavenward and hold his face erect towards the stars.

"Pronaque cum spectent animalia cetera terram,
Os homini sublime dedit, cœlumque tueri
Jussit, et erectos ad sidera tollere vultus." *

Ovid, Metamorphoses: I, 84-86.

* Compare Milton:

"A creature who not prone
And brute as other creatures, but endued
With sanctity of reason, might erect
His stature, and upright with front serene
Govern the rest, self-knowing,"

Paradise Lost: VII, 506-510.

The erect position is, however, gradually acquired. As in the sphinx's riddle, we literally go on all fours in the morning of life, and the difficulty that an infant experiences in learning to walk erect is strong evidence that that is an accomplishment acquired by the race late in its history. We ought, if this is the case, to find in the human body indications of a previous semi-erect posture. There is a vast amount of evidence of this character, and I can only sketch the outlines of it.

The erect position in standing is secured by the shape of the foot, by the attachment of strong muscles at points of severest strain, and by the configuration of the great joints which permits them to be held locked when a standing posture is assumed. All these features are liable to great variation; they are less marked in children and in the lower races. Let us examine them somewhat more carefully.

The Caucasian type of foot is evidently that best adapted for the erect position. The great toe is larger, stronger, and longer than the others, making a firm support for the inner anterior pier of the arch formed by the bones—an arch completed by a well-developed heel and maintained by a strong dense band of fascia and ligament binding the piers together like the tie-rod of a bow-string truss—thus producing a light and elastic structure admirably adapted to support the weight of the body and diminish the effect of shocks. In the lower races of man all these characters are less marked. The great toe is shorter and smaller, the heel-bone less strongly made, the arch much flatter. This flattening of the arch produces the projection of the heel found in some races.

The muscles required for maintaining the erect position are those which from our predilection for human anatomy we are apt to call the *great* extensors, overlooking the fact that in other animals they are by no means as well developed as in man. Being required at the points of greatest strain, all are situated on the posterior aspect of the body—the calf, the buttock, and the back.

A very slight examination of any lower animal will show how strikingly it differs in the muscular development of these regions. The great muscle of man's calf, the triceps extensor suræ, is formed by the welding together of some four muscles separate in many lower forms. Varieties are found in man showing all grades of separation in these elements. One of the muscles, the plantaris, was formerly a great flexor of the toes, the plantar fascia representing its former distal extent. Like the palmaris of the arm it lost

its original function by the welding of the fascia to the bones to secure the plantar arch, and its functions being then assumed by other muscles it began to dwindle, and is now represented by a mere vestigial rudiment of no functional value. It is well known that the lower races of men have smaller calves than Europeans. Again, it should be noted that as the erect position is assumed the muscles required for the flexion and independent action of the toes become reduced in character. A comparison with other forms shows that some of the small muscles now confined to the region of the foot formerly took their origin higher up, from the bones of the leg. Losing in functional importance, they have dwindled in size and gradually moved downward.

The great glutæi muscles of the buttock find their highest development in man. They are subject to similar variations. Certain muscles of this region, normal in apes, are occasionally found in man—a separate head of the great glutæus, derived from the ischium, and the scansorius, or climbing muscle, that assists the great flexor of the thigh (the ilio-psoas) may be mentioned.

The enormous size and complexity of the muscles of the back in man are well known. The erector of the spine fills up the vertebral grooves and sends up tendons along the back like stays supporting the masts of a ship. The mass of this muscle is comparatively less in anthropoids.

Notwithstanding all these powerful muscles, it would be impossible to retain the erect position for any great length of time were we to depend upon them alone, for it requires as before stated, a great expenditure of force to keep a muscle in active use. It becomes rapidly fatigued and then loses its power, as any one may prove by standing in any constrained position, even “in the position of a soldier,” for half an hour. To provide against this a beautiful arrangement of joints and ligaments has been developed.

When in the erect attitude the ankle-joint is so arranged that its bones are in a position of greatest stability, and the center of gravity is so adjusted that it falls directly upon it. This reduces to a minimum the amount of muscular force required to keep the body erect. At the knee the center of gravity falls a little in front of the axis of the limb, and the back and sides of the joint are provided with check ligaments or straps that hold the joints locked in a position of hyper-extension, so that no muscular force whatever is used to maintain it. These ligaments are regressive structures, being ves-

tiges of former insertions of muscles near the joint. At the hip a similar condition occurs, the center of gravity falling behind the joint and the whole weight of the trunk being hung upon the ilio-femoral ligament. This structure is much more marked in man than in other mammals, and is found to vary considerably in its size and strength.

The spinal column has been remarkably modified to adapt it to the erect position. Before the fifth month of uterine life the whole spine describes a single, large, dorsally directed curve like that of the quadruped, arranged to accommodate the viscera. As this would be incompatible with the erect posture, two additional curves in the opposite direction are formed—one in the region of the loins just where the center of gravity would begin to fall forward, another in the neck to counteract the heavy and unstable weight of the head. These curves are gradually acquired. While possessed by all races, and in a less degree by the higher apes, they arrive at their highest development in Europeans. Careful measurements show that the shapes of the vertebræ have been gradually modified. There is no abrupt transition from the spine of the lowest savages—Australian, Bushman, Andaman—to that of the gorilla, gibbon, and chimpanzee, and the lumbar curve of the lower races of men is much better adapted to running in a semi-erect position through the jungle or bush.

There is also evidence that the posterior limbs have moved forward upon the spinal column in order that the erect position may be assumed with less effort. In man there are between the skull and the sacrum twenty-four vertebræ. The other primates have usually twenty-six, although the gorilla, chimpanzee, and orang agree with man. Now in foetal life the attachment of the hip-bones to the sacrum commences from below upward. Union first occurs with the third sacral vertebra, leaving twenty-six presacral, then advances forward, the first sacral uniting last of all. The hip-bones actually move up along the spine a distance of two segments. Occasionally this shifting is carried still farther, and but twenty-three presacral vertebræ are left. Anomalies caused by an arrest of development at some stage of this process are not at all infrequent. The most common is the want of union between the hip-bones and the first sacral vertebra, thus producing apparently six lumbar vertebræ. A most beautiful specimen of this anomaly was found last winter in my laboratory.

The spine is sustained erect by stringing from vertebra to vertebra numbers of short ligaments that reduce to a minimum the muscular exertion required to support it. These are particularly numerous between the spines along the great dorsal curvature. Some of these ligaments are replaced by small muscles, very inconstant and variable, the survivals of a whole system of musculature that had for its object the moving of the separate joints of the spine, one upon another.

The head is also much modified by the erect position. In quadrupeds its suspension requires an extensive apparatus, a large, strong, elastic strap—the *ligamentum nuchæ*—passing from the tips of the thoracic vertebræ to the occiput, sending processes to all the neck vertebræ involved in the strain. Though need for it has in great degree ceased, since the head has become poised in such a way as to involve but little expenditure of muscular force, yet relics of this great suspensory apparatus remain in man's neck in the form of thickened fascial bands.

The arrangement of the great foramen of the skull that transmits the central axis of the nervous system, the spinal cord, is necessarily different in an animal carrying its head erect. The foramen would naturally tend to be set forward, more under the center of gravity, and its inclination would be more nearly horizontal. Here again we see that the ideally perfect form is more nearly approached in the civilized races. It is never quite realized, and indeed the whole skull and its contents evince markedly that they are still undergoing an evolution. Again the lower races show variations that unite them with the anthropoids. While a negro may have a foramen magnum inclined 37° to the horizontal, the orang may fall to 36° .

But it is not only in this way that we get evidence that the erect position has been gradually acquired. Since gravity plays an important part in the functions of the visceral and circulatory systems, any marked change in the line of equilibrium must necessarily be accompanied by disturbances. These disturbances, to a certain extent, conflict with the acquirement of the position; as they weaken the animal. In the course of time the body may perhaps become adapted to the changed conditions, but before that perfect adaptation takes place there is a period of struggle. There is abundant evidence that such a struggle has occurred and is yet going on; the adaptation being as yet far from complete.

The most striking and important of these adaptations concerns the pelvis. When the erect posture is assumed, the weight of the viscera being thrown upon this bony girdle, it becomes adapted for their support by becoming more fixed and dish-like in shape. This is naturally more pronounced in the female, since with her the pelvis must bear the additional weight of the pregnant uterus. It is evident that a solid, unyielding, laterally expanded ring of small aperture would give the most effective support in the erect position, but it is equally clear that with any such structure parturition would be impossible. In the quadruped the act of parturition is comparatively easy, the pelvis offering no serious hindrance. The shape of the female pelvis is therefore the result of a compromise between two forms—one for support, the other for ease in delivery. When we reflect that along with the acquirement of the erect position the size of the head of the child has gradually increased, thus forming still another obstacle to delivery and to the adaptation which might otherwise have taken place, we can realize how serious the struggle has been, and no longer wonder that deaths in child-birth are much more common in the higher races, and that woman in her entire organization shows signs of having suffered more than man in the upward struggle.

In no other animal is there shown such a distinction between the pelvis of the male and that of the female—a distinction that increases as we ascend the scale. While the amount of individual variation is great, we yet see, particularly in the pelvis of the Andaman Islanders and of the Polynesian races, distinctly anthropoid characters. The scanty material at hand indicates that a similar transition occurred between the modern and prehistoric types. The approximation of the infantile and simian forms is well known.

The pelvis alone does not suffice to support the viscera. In quadrupeds the whole weight is slung from the horizontal spine by means of a strong elastic suspensory bandage of fascia, the tunica abdominalis. The part of this near the thorax has in man entirely disappeared, being no longer of any use. In the groin it remains to strengthen the weak points where structures pass out from the abdominal cavity. That it often is insufficient to withstand the great pressure is testified by the great prevalence of hernia, another sign of imperfect adaptation. The frequency of uterine displacements, almost unknown in the quadruped, has also been noted. It is significant that one of the most effective postures for treating and

restoring to place the disturbed organ is the so-called "knee-elbow position," decidedly quadrupedal in character.

Many other indications are found in the viscera. The urinary bladder is so arranged in man that any concretions do not gather near the opening of the urethra where they might be discharged, but fall back into the cul-de-sac at the base, where they enlarge and irritate the mucous lining. The cæcum, with its vermiform appendage, a vestigial organ finding its proper functional activity far below man, is so placed in quadrupeds that the action of gravity tends to free it from fœcal accumulations. In man this is not the case, and as a consequence inflammation of this organ or its surrounding tissues, very serious and often fatal, is by no means rare. It may be noted that the ascending colon is obliged to lift its contents against gravity, and that in a lowered state of the system this might very readily induce torpidity of function.

The gall bladder in quadrupeds also discharges at an advantageous angle. In man, although the difference is slight, it appears to be sufficient to cause at times retention and consequent inspissation of the bile, leading to the formation of gall-stones.

The quadruped's liver hangs suspended from the spine, but as the erect attitude is assumed it depends more and more from the diaphragm. The diaphragm in its turn develops adhesions with the fibrous covering of the heart, which is continuous with the deep fascia of the neck, so that in effect the liver hangs suspended from the top of the thorax and base of the skull. This restricts in some degree the action of the diaphragm and confines the lungs. This must have an effect upon the aeration of the blood, and consequently upon the ability to sustain prolonged and rapid muscular exertion. An extra lobe of the right lung that in animals intervenes, either constantly or during inspiration, between the heart and the diaphragm, is occasionally found in a vestigial state in man.

The vascular system abounds in evidences that it was primarily adapted to the quadrupedal position. By constant selection for enormous periods of time the vessels have become located in the best protected situations. It is scarcely possible to injure a vessel of any size in an animal without deeply penetrating the body or passing quite through a limb. In man, on the contrary, several great trunks are comparatively exposed, notably the great vessels of the thigh, those of the fore-arm, and of the ventral wall.

The influence that gravity has upon the circulation is well known.

The horizontal position of the great venous trunks favors the easy flow of blood to the heart without too greatly accelerating it. Man, in whom these trunks are vertical, suffers thereby from two mechanical defects—the difficulty of raising blood through the ascending vena cava, whence come congestion of the liver, cardiac dropsy, and a number of other disorders, and the too rapid delivery through the descending cava, whence the tendency to syncope or fainting if for any cause the action of the heart is lessened. Clevenger's admirable discovery that the valves of the veins are arranged for a quadrupedal position should also be mentioned here. Evidently intended to resist the action of gravity, they should, to be effective, be found in the large vertical trunks. But in the most important of these they are wanting; hence are caused many disorders arising from hydrostatic pressure, such as varicose veins, varicocele, hæmorrhoids, and the like. Yet they occur in several horizontal trunks, where they are, as far as we know, of no use whatever. Place man on all fours, however, and it is seen that the entire system of valves is arranged with reference to the action of gravity in that position. The great vessels along the spine and the portal system being then approximately horizontal do not require valves, while all the vertical trunks of considerable size, even the intercostal and jugular veins, are provided with them. A confirmation of this view is found in the fact that the valves are variable in character and tend to disappear in the veins where they are no longer needed.

Every animal possessing a back-bone may be said to consist of a series of disc-like segments, arranged on a longitudinal axis. These segments are originally similar in character, but become specially modified in innumerable ways to meet the needs of the individual. Anatomists conclude, upon surveying the whole field, that this indicates a derivation of the vertebrates from some form of the annelid worms, among which a single unit produces by successive budding a compound longitudinal body. This view is fully confirmed by the behavior of the human embryo.

The number of the segments varies considerably, rising sometimes to as many as three hundred in some fishes and reptiles, and being generally greater in the animals below man. There are many indications, however, that in man, segments formerly possessed have disappeared. Leaving the skull for the present out of account, there are in the adult thirty-three or thirty-four vertebræ that may

be held to represent these segments; the additional vertebra, when it occurs, almost invariably belonging to the coccygeal or caudal series. In the human embryo thirty-eight segments can at one time be made out. Four or five of these generally disappear, but cases are by no means wanting in which they remain until after birth and constitute a well-marked free tail. In one case, carefully examined and described by Lissner, a girl of twelve years had an appendage of this character 12.5 centimeters long. Other observers, probably less careful and exact, report much greater lengths. From some observations it would appear that abnormalities of this kind may be transmitted from parent to offspring.

Dr. Max Bartels recently collected from widely scattered literature reports of 116 actually observed and described cases of tailed men. In 35 instances authors reported such abnormalities to be possessed by an entire people, they themselves having observed certain individuals. These cases are scattered throughout the whole of the known globe and extend back for a thousand years. When we consider that the authenticity of many cases is beyond question, and that the number that escaped accurate observation and report must be much greater, we can see that we are not dealing with so rare a phenomenon as would at first be supposed.

Other regressive structures are abundant in this region. The spinal cord in its earlier state extended the entire length of the vertebral canal. In the child at birth it occupies only 85 per cent. of that length; in the adult 75 per cent. This is due mainly to the more rapid growth of the spine. There stretches, however, from the lower end of the cord down to the very end of the spine a small thread-like structure, the *filum terminale*, a degenerated vestige of the lower caudal part of the spinal cord. Wiedersheim suggests that the frequent occurrence of degenerative disorders in the lower end of the adult cord may be due to a pathological extension of the normal atrophy. Rauber found in this region traces of two additional pairs of spinal nerves. The vessel that runs down in front of the sacrum and coccyx corresponding to the caudal artery of quadrupeds shows signs of a former more extensive distribution, as it ends in a curiously convoluted structure known as the coccygeal gland, containing vestiges of vascular and nervous tissues. Traces of caudal muscles still remain, notably the ischio-coccygeus, which in animals moves the tail sideways, and the anterior and posterior sacro-coccygeus, for flexing and extending it. Occasionally the

agitator caudæ is found as a muscular slip passing from the femur to the coccyx. These muscles cannot be of any value in man, as the coccyx is practically immovable. At the point where the end of the spine was primarily attached to the skin a dimple is formed by regressive growth, and here the direction of the hairs also shows an aborted organ.

Another interesting condition connected with segmentation is the varying number of ribs. Most mammals have more ribs than man, and as we descend in the scale they continue to increase. A study of development indicates that a rib is probably to be considered as an integral portion of a vertebra. As the arch of a vertebra encloses the central nervous system, so the ribs enclose the visceral system. If this be correct they ought to be found throughout as far as the body cavity extends. This is really the case. They exist in the neck as the anterior bars of the transverse processes, in the loins as the transverse or costal processes themselves, in the sacrum welded together into what are known as the lateral masses. A great number of considerations derived from comparative anatomy, from embryology, and from variations found in the adult combine to support these conclusions.

Nothing would seem less likely at first sight than that the capacious expanded brain-case or skull with its complicated structure should be composed of segmental pieces like the vertebræ; yet there is no doubt that the poet Goethe was on the right track when he made that important generalization. The details of the segmentation are very far from being worked out, but a vast amount of evidence indicates that the general conclusion is correct.

Since the predominant necessity in the construction of the skull is to afford a protection for the brain, we need not be surprised to find that it is very greatly modified in man. Enormous labor has been bestowed upon craniology in an attempt to separate definitely the races of men as well as to connect them with the lower forms. The success in establishing races has not been such as was anticipated. A constant intergrading of forms defies all attempts at a hard and fast classification. We also see types that intergrade between anthropoids and man, and find abundant evidence that the human skull was derived from a form similar to that of still lower mammals.

At first man's skull seems to be much simpler than the typical form. The bones are fewer and less complicated. But follow back

the course of development and we find the bones separating—the frontal into two pieces, the occipital and temporal each into four, the sphenoid into eight, repeating what we find as we descend the vertebrate scale.

Many of these peculiarities may remain throughout life. Such are the interparietal bone, found very frequently in ancient Peruvian and Arizonian skulls; the division of the frontal and temporal bones each into two, the persistence of the intermaxillary bones and of that division of the cheek or malar bone known as the *os japonicum*. Even cleft palate, a deformity and defect in man, merely reproduces a state natural to some of the lower mammals.

There are also present structures that are homologous with the so-called visceral arches represented in the thorax by ribs. Such are the lower jaw, the hyoid bone, and the thyroid cartilage. A study of the embryo shows us that these are portions of a series of bars primitively arranged on the plan of the branchial apparatus of the water-breathing vertebrates. Each bar has its appropriate skeleton and vascular supply, and is separated from the contiguous ones by a cleft that at first passes entirely through the soft tissues and communicates with the primitive visceral cavity. These clefts may persist and cause serious deformities. The skeleton of the mandibular and hyoid bars is remarkable as containing indications of elements present in the lower vertebrates. In fishes the lower jaw articulates with a large bone apparently not found in mammals, but on tracing carefully the development of the mammalian skull it is found that this bone is represented by the incus, one of the minute ossicles of the ear. In the *fœtus* the primitive lower jaw, in the shape of a bar of cartilage, actually extends into the ear cavity and the upper end of it remains as the malleus. Relics of the hyoid or second branchial arch are also found—the styloid process of the temporal bone being one of them.

The capacity of the cranium is usually held to distinguish man remarkably, yet the lowest *microcephali* approach the apes in this respect, and the lower races have unquestionably smaller brains than the higher. As far as can be judged, there has also been an increase in average capacity during historic times. One fact pointed out by Gratiolet is very significant. In monkeys and in the inferior races the ossification of the sutures commences at the anterior part of the head, while in Europeans these sutures are the last to close. This would indicate a greater and longer continued increase of the frontal lobes of the brain.

The same remarks may be made concerning the facial angle and prognathism. While by none of the different angles proposed have we been able to definitely separate distinct races, yet we find that the angle of the lower races and of microcephali approaches that of the anthropoids, and that as the capacity of the skull has increased the jaw has been thrust back under it to support the weight. This shortening of the jaw gives the characteristic expression of the civilized face. We at once recognize a brutal physiognomy by the projection and development of the great masticating apparatus, used in most animals near man as a formidable weapon of defense. The shortening has produced some very remarkable changes. It has shoved the third molar or wisdom tooth so far back that it is crowded against the ascending part of the jaw, thereby occasioning disturbance and trouble in its eruption. Being no longer practically useful, it tends to disappear, and many people never cut any wisdom teeth. Among the Australasians, on the contrary, a fourth molar is not infrequently found, and rarely in European skulls. Evidences also exist of a lost incisor in the upper jaw on each side. Dental follicles form for it and usually abort, but occasionally the tooth appears fully developed in the adult. The great canines or eye-teeth, used in apes and other animals for tearing and holding, are in them longer and larger than the other teeth, and room is made for them in the opposite jaw by leaving an interval, called the diastema, between the canine and the tooth next to it. These large projecting canines have disappeared in the normal human skull and the diastema has accordingly closed up. Yet it is by no means uncommon to see the whole arrangement reappear, especially in low-type skulls. Projecting canines or "snag teeth" are so common in low faces as to be universally remarked, and would be oftener seen did not dentists interfere and remove them. It may be noted also that the muscle that lifts the lip from over the canines and bares the weapon often reappears in man and is used in snarling and disdainful expressions.

Many details of structure of the skull point in the same direction. Occasionally the occipital bone has a third condyle as in some other mammals or a large lateral projection like that of a vertebra, the paramastoid process, or indications of a separate centrum (*os basioticum* of Albrecht). It may have interiorly a hollow (*fosselle vermienné*) for the vermiform process of the cerebellum, and exteriorly a large transverse ridge (*torus occipitalis*) for the insertion of the muscles of the nape. All these peculiarities are more frequent as

we descend the scale, whether we regard the lower races of man, microcephalic individuals, or lower animals. Like many of these atavistic features they are also more common among the criminal classes.

I have omitted the discussion of many important structural features that mark various stadia in man's ascent. From the muscular system alone there could be adduced a very great number of instances of the survival of primitive forms and of progressive variations, particularly in the development of the muscles of the face and breast. In the osseous system also there are many such, among which may be mentioned the episternal bones, the central bones of the wrist and ankle, and the os acetabuli. The exact significance of these is still under discussion, as is also the question of supernumerary digits that sometimes appear on the hands and feet.

Additional instances might be drawn from the visceral system. The larynx contains small throat pouches like the great air sacs of the anthropoids. The pharynx of the embryo is lined with cilia like that of the very lowest vertebrates. Traces of the primitive intestine are shown by the peculiar distribution of nerves and the folding of the peritoneum. The liver and spleen both occasionally indicate a previous simpler condition, and the intestine has sometimes diverticula of no functional use—indeed, likely to be disadvantageous—yet pointing to a previous state. These anomalies never occur at random, but can be explained consistently upon the theory of reversion.

The genito-urinary system abounds in them. The uterus may have two cavities, as in many quadrupeds, or approach that condition by being bicornuate, as in apes, and a great variety of other vestigial structures occur, all pointing back to an original neutral condition, before the sexes were differentiated.

In the nervous system there is no lack of instances. Our studies of the brain are as yet far from complete—indeed, we seem to be only at the threshold of a reasonable knowledge of the nervous centers—and the crowd of names, the inextricable maze of synonymy that now obscures that region is only a mark of our ignorance. It is a case of "*omne ignotum pro mirifico*"—ignorant of the true value of the parts we examine, we have named even the most insignificant details of structure. Perhaps one of the most interesting results of modern research is the conclusion that the psychic life of our ancestors must have been different from our own, since they possessed

organs of sensation differing in degree and probably in kind. The sense of smell as indicated by the size of the olfactory bulbs of the brain is decreasing in acuteness. The foetal brain possesses comparatively larger bulbs, as do also the brains of lower races and of anthropoids. The sense, being no longer required for the preservation of the species, is slowly becoming dulled. Jacobson's organ, a curious structure found in many mammals, combining in some unknown manner the olfactory and gustatory senses, occurs in a vestigial state in man, and the duct connecting it with the mouth yet remains as the anterior palatine canal. The pineal and pituitary bodies of the brain probably represent obliterated sense organs, the former being an eye, the latter having some connection with the pharynx. Our other senses have also been modified. The eye has a rudimentary third eyelid, such as birds and lizards possess, covered with minute hairs. The external ear shows signs of derivation from the pointed ear of quadrupeds and abounds in vestigial muscles such as they use for controlling and directing it.

From this rapid sketch it will be apparent to you that the evidence that man's path upward has led along the same route traveled by other animals is now very powerful in its cumulative weight. By no other argument can we satisfactorily explain the bewildering maze of resemblances; yet when called upon fix the exact line by which we have reached our present estate we at once meet with serious difficulties. It is a popular misconception that there has been a regular chain-like series, with now and then a "missing link." The various races of men and the anthropoids are merely one branch of the great tree Yggdrasil, that overshadows the whole earth and reaches up into heaven. The individuals that we compare occupy the terminal twigs of that branch, being not related directly but only as springing from a common stock. The fact that resemblances occur does not necessarily prove a lineal descent but rather a common ancestry. The races of man arose far back in prehistoric night.

- Each in its own way fought the struggle for existence. Favored more by climate, the Caucasian appears to have attained an intellectual superiority; yet it should not be forgotten that the others also excel, each in its own special way. The white races endure with difficulty the climate of the tropics, and without help would starve in the Australian bush and the Arctic ice-fields.

Notwithstanding all that I have said concerning reversionary characters, we yet have hardly sufficient structural grounds for separating

the races of man. Different varieties of the Caucasian race show marked variations. Between the lowest and most brutalized laborers and the cultivated and intelligent classes there exist anatomical differences as great as those which separate the white and the negro. The rapid change in the African races, remarkably shown in America in the three generations now before us, is a more conclusive proof of inferiority, as it indicates that they have not had time to acquire fixed characters.

Again, as to the anthropoids, it is evident that they have widely diverged from man, and that none represent the primitive ancestor from which all were derived. The comparison of a human skull with that of an adult gorilla or chimpanzee is very striking. On the one hand we see all the structural features subordinated to the necessity of forming a capacious receptacle for the brain; on the other, a similar subordination for producing an effective fighting apparatus—jaws, teeth, and ridges for the insertion of powerful muscles. In one, intelligence predominates; in the other, force. The skulls of the young of all these species show, however, much greater resemblances than those of adults. This seems to indicate that there must have been a primitive common type from which all have diverged. Savages when ill-fed and living in unfavorable conditions may simulate the habits of anthropoids, and this has an effect upon their physical structure, yet not on that account should we too readily accept their close relationship.

In this summary, I have purposely refrained from any discussion of the physiological phenomena that necessarily accompany anatomical structure. Yet these are most important. Anatomy and physiology are inseparable, each being dependent upon the other. The results of the erect position, of increased size of brain, of greater specialization of limbs, are almost incalculably great; so great that they affect the whole life of the animal—control his habits, direct his actions in war and in the chase, and finally mold peoples, nations, and races.

As Cuvier was able to deduce an animal's habits from the shape of his teeth, so we may speculate as to man's past and future from an examination of his anatomy. *Ex pede Herculem* has not ceased to be true. It would be impossible for me to adequately treat of all these results in one short hour; the subject must necessarily be deferred to another time and another place. If I have succeeded in showing you that structural features form no insignificant part of anthropology my object is attained.

"GENS" AND "SUB-GENS," AS EXPRESSED IN FOUR SIOUAN LANGUAGES.—The American Anthropologist for April, 1888, contained an article, "Meaning of the words for Gens in the Iroquoian and Algonquian Tongues," by Mr. J. N. B. Hewitt. He states that in nearly all the Iroquoian languages the word for gens also signifies clay or mud, and he finds a like peculiarity in the Algonquian. This is not the case with the four Siouan languages under consideration.

In Dakota, gens is o-tshe'-ti, *fire-place*; hence, one of the names which the Dakotas have given themselves, O-tshe'-ti sha'-ko-win, *seven fire-places*, comprising the seven original gentes, now tribes, Mdewakantonwan, Wakhpekute, Wakhpetonwan, Sisitonwan, Ihank-tonwan, Ihanktonwanna, and Titonwan. The sub-gens is ti-o-shpa-ye, *a group of those who camp by themselves*.

The Omaha and Ponka call the gens tan'-wan-gdhan u-ba'-nan or tan'-wan-gdhan u-ba'-te, *a village or group of people springing from a common stock*—banan and bate, referring to *a clump of trees* springing from a common root or stump. All the gentes are described as tan'-wan-gdhan ba-nan'-nan, or tan'-wan-gdhan ba-te'-te. But their terms for *sub-gens* are tan'-wan-gdhan u-ki'-gdha-sne, *a segment of a village*, or, *one of the parts into which a stump has been split* (u-ga-sne), and u-ne'-dhe, *a fire-place*.

The Kansa have the term tan'-man u-ki'-pa-te, sociative in form, and therefore applicable to the *sub-gens* rather than to the gens.

The Osage tell of the Tsi'-shu u-tse' pe-dhün'-pa, the Han'ka u-tse' pe-dhün'-pa, and the Wa-ca'-ce u-tse' pe-dhün'-pa, all twenty-one gentes being in the Osage nation or confederacy. U-tse means *fire-place*, and pe-dhün'-pa *seven*. There are fully sixty-seven gentes and sub-gentes among the Osage, that number of names having been gained, but the name for sub-gens is still unknown to the writer. Another Osage term for "gens" is u-pa-tse, which corresponds to the Omaha and Ponka ubate.

The Tciwere tribes (Iowa, Oto, and Missouri) call a gens ki-kra-tshe, as, Wa-ka" ki-kra'-tshe, *they call themselves (after a) Snake*. The name for *sub-gens* was not obtained, though each Iowa gens had four sub-gentes whose names have been recorded (excepting those of one gens), and there are still sub-gentes in one Missouri gens.

The Winnebago name for gens is i-ki'-ka-ra'-tsha-da, answering to the Tciwere kikratshe. Hence, Ta'i-ki'-ka-ra'-tsha-da, *the Deer gens*. No name for *sub-gens* has yet been found by the writer, though there are sub-gentes in the Bird gens.

J. OWEN DORSEY.

EXCAVATIONS IN AN ANCIENT SOAPSTONE QUARRY IN THE DISTRICT OF COLUMBIA.

BY WILLIAM H. HOLMES.

Having completed the examination of the quartzite boulder quarries on Piny Branch and Rock Creek, it seemed appropriate that some attention should be paid to the soapstone quarries of the neighborhood. It was hoped that a comparison of the methods of quarrying and manufacture and of the tools used in the two classes of quarries would throw some light upon the relationships of the peoples concerned and thus aid in the solution of one of the foremost problems of American archæology, the antiquity of man's presence here.

Deposits of soapstone occur at a number of points within the limits of the District of Columbia, but only one locality exhibits abundant traces of ancient working; this site is known as the Rose Hill Quarry and is situated on Connecticut Avenue extended, four miles from the Executive Mansion and three-fourths of a mile east of Tennallytown. It is distant about one and one-half miles from each of the great quartz boulder quarries recently examined and partially described in the July number of this journal.

Steatite is of common occurrence over a wide belt of territory extending through the New England States and continuing down the Atlantic slope to Alabama. It is associated with the gneissic rocks and occurs in somewhat disconnected patches or areas, not yet fully traced by geologists. Outcrops have been worked in hundreds of places by the aborigines. More recently the whites have mined it extensively, and many of the quarries worked by the Indians have been disturbed and traces of the ancient work obliterated. In a few places observations have been made by scientific men, and many examples of the tools used and of the articles manufactured have been collected. The finest and most extensive collection of such objects is in possession of Mr. J. D. McGuire, of Ellicott City, Md., to whom I am greatly indebted for the privilege of their examination.

The Rose Hill Quarry seems to have been first studied by Dr. Elmer R. Reynolds, who published a careful description of the site and of the

articles collected by himself in the Thirteenth Annual Report of the Peabody Museum.* About that time visits to the site were made by Mr. F. H. Cushing, Dr. Charles Rau, Prof. O. T. Mason, and others, and extensive collections of articles, mainly from the surface of the ground, were made. Mention is made by Mr. Reynolds of excavations conducted by these gentlemen, but no definite information upon this point is on record.

A paper published by Louis A. Kengla, in 1883, gives considerable additional matter, accompanied by illustrations of fragments of vessels obtained in the District. †

The present notice is not intended to be an exhaustive study of the ancient work, as it is desired only to institute a comparison between these quarries and the other quarries of the District. The whole subject of the working of soapstone by our aborigines may well receive separate and exhaustive treatment.

TOPOGRAPHIC AND GEOLOGIC FEATURES OF THE ROSE HILL SITE.

The mass of steatite exposed on this site, being firmer and tougher than the gneisses with which it is associated, gave rise to a very decided prominence, now separated into two hills by a sharp ravine cut by the stream. The natural exposures are confined to the bed and the steeper banks of the stream and to the crests of the hills, which rise in somewhat conical form—the one on the south side to about 80 feet and the one on the north side to upwards of 90 feet above the stream.

The northern hill has a rounded, somewhat oblong summit, on which the steatite is exposed or approaches very near the surface for a length, nearly north and south, of upwards of 100, and a width of twenty or thirty feet. The rock seems to be bedded with the greatest length of the crest and consists of nearly vertical, more or less massive, layers of steatite. The slopes of the hill are covered with deposits of clay and vegetable mold, and consequently the formations with which the steatite is surrounded and interbedded are in no place visible. The whole site is thickly covered with forest trees and underbrush.

* E. R. Reynolds, Thirteenth Annual Report of the Peabody Museum, p. 526.

† Louis A. Kengla, Archaeology of the District of Columbia, Washington, 1883.

SURFACE INDICATIONS OF THE ANCIENT QUARRIES.

The evidences of ancient pitting are confined chiefly to the summits of the hills, but no one can say to what extent the exposures of soapstone in the sides of the ravine were worked. The south bank of the stream has recently been worked to a considerable depth by the whites, and the original configuration is destroyed; but on the north side there is an obscure but still traceable excavation of very considerable dimensions that may be at least partially due to aboriginal hands.

Pits sunk in the side of the hills would soon be obliterated by debris descending from above, but upon the crests they would necessarily remain clearly marked for a long period of time, as their obliteration would depend upon the very slow accumulations of vegetable mold. In any attempt at estimating age, therefore, the relation of the excavations to the surrounding surface must be considered with care; this has already been pointed out in connection with the quartzite boulder quarries.

My work has been confined exclusively to the summit of the northern hill, as the ancient quarries there appear to have remained wholly undisturbed, save by the normal agencies of nature. A row of pits, forming almost a connected trench, extended along the crest and for a short distance down the north end of the hill. There were five well-marked depressions in this series. The outlines were irregular. The greatest diameter was perhaps 25 feet and the greatest depth, save where measured between the lateral ridges of debris, was not above two feet. Dr. Reynolds mentions one pit upon the southern hill as being over three feet deep. The heaps and ridges of debris thrown from the pits by the ancient miners extended along the sides of the row of pits and were hardly above a foot in height. This debris consisted for the most part of earth and irregular fragments of steatite. Among the latter were many worked pieces—fragments of unfinished vessels and rejects of all kinds.

Shallow depressions marking the sites of ancient pits occur along the sides of the crest on the south and west sides of the hill.

EXCAVATIONS.

Operations were commenced by carrying a trench across the southern pit, which occupies the highest point of the hill. This

exposed the ancient quarry face on the south, east, and west sides, while the north edge of the excavation penetrated the full depth of the ancient quarry, which was here about four feet deep.

Beginning with the deepest part of this first trench, a wide trench was carried north along the chain of ancient pits. Cross-trenches were dug at frequent intervals and others were subsequently dug on the south slope. In all about 500 square feet of the ancient quarry floors were exposed and cleared off, and a very good idea of the nature of the ancient quarrying was thus obtained. The principal pits were worked to a depth of from two to four or five feet by the aborigines, and the bottoms and sides present the irregular appearance necessarily produced by prying out such masses of potstone as the quarrymen were able to detach.

IMPLEMENTS USED IN QUARRYING.

As with the quartzite boulder quarries, little could be learned of the methods of quarrying. Perhaps wooden, horn, or bone tools were used to loosen and remove the earth and, with the assistance of hafted stone implements, to detach and break up the rock. There is no indication that the potstone was detached by cutting or picking with pointed tools. The exposed surface seems for the most part to represent cleavage planes.

SHAPING OF VESSELS.

These ancient quarries were worked exclusively for the purpose of securing material to be used in vessel-making. The pots were not shaped in place to be detached by under-cutting after the roughing out was accomplished, as observed by Schumacher in California. It would appear that these vessels were usually too wide to permit of this method of working and detachment. No tool in the possession of our eastern aborigines would have been equal to such an undertaking save by immense expenditure of labor; beside, there was too much uncertainty as to the cleavage and fracture of the stone to waste time in shaping before thorough testing by removal. The block was first secured, then trimmed down to the approximate size and form, and then hollowed out ready for the finish, which was in most cases accomplished elsewhere. Even with this method there were naturally many failures from breaking, from splitting along partially developed cleavage planes, and from imperfections in tex-



FIG. 1.



FIG. 2.

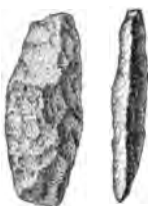
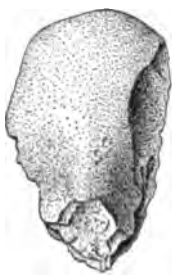


FIG. 3.

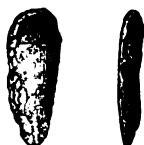


FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.



Implements used in quarrying and cutting Soapstone, $\frac{1}{4}$ actual size.



ture. It is safe to say that many hundreds of these failures yet remain upon this site, in the pits, in the piles of *débris*, and scattered far down the slopes and along the stream beds.

On account of the rude state of the rejects left upon the quarry site we cannot in all cases determine the precise character of the vessel intended. The whole range of steatite utensils employed by the Algonkian people are probably represented. A prevailing form is the oblong basin having ear-like projections or handles at the ends. These incipient vessels are usually shallow. The largest specimens are about 25 inches in length. The width is not more than half the length and the depth averages perhaps one-half the width. The rejects are very often unsymmetric and extremely rude. Other forms, approaching more nearly a circular outline and usually having greater depth, are common. Roughed out cups of small size are found in considerable numbers. Handles vary much in size, shape, and position.

The shop refuse contains illustrations of manufacture beginning with specimens rejected almost with the first stroke of the shaping process and ending with vessels so nearly complete as to have been fitted for use. The best, however, still lack the finishing touches observed in specimens found on village sites. The first step was naturally that of testing and reducing the shapeless mass to a rude approximation of the proportions of the vessel to be made. A favorable side for the top was chosen and the excavation began, perhaps by pick strokes outlining the basin, perhaps in cases by working from the center out toward the rim; there was probably no uniform method of procedure.

Tool-marks are much obscured by weathering in specimens found upon the surface, but in those from a depth they are as fresh as if made but yesterday. The tool has in cases been pointed or spike-like, but generally had a rounded cutting edge half an inch or more in width. This edge was, as a rule, rather rough and uneven, as if of chipped rather than of polished stone. The character of the strokes vary a great deal; in some cases they are bold and professional in appearance and in others timid and irregular.

There are three ways in which the aboriginal tools could have been used. The simplest is that of holding the heavy pointed stone in the hand or hands and thus striking the potstone. Much power is gained by hafting the tool and using it as an *adz*. The length, boldness, and irregularity of the marks upon the rough pots suggest

this method very strongly. Again, a chisel and mallet may have been used, after the fashion of the modern stone-cutter. The marks left by the latter process would assume a more regular arrangement than observed in the products of this quarry, and they would exhibit evidence of a succession of blows. There are no chisel-like tools that bear evidence of use under a hammer or mallet, and we know of nothing that could have served as a striking tool. I am inclined to favor the idea that a hafted tool was used in the roughing out. One grooved axe only was found, but the ancient quarries of Maryland furnish many examples of pick-like forms provided with grooves.

THE TOOLS RECOVERED.

The tools with which the work of quarrying was accomplished were sought most assiduously. Their character and their relations to implements found in other localities and applied to other uses are matters of no little interest to the archæologist. It was expected that they would, in a measure at least, correspond to the tools known to be used by the modern Indians, as many steatite pots are found upon ordinary village sites. It was to be expected, however, that tools used in such work would be especially adapted to it, which is unlike any other industry of the aborigines, and that they would be in a sense unique; but there were chances that implements of well-known forms were used and lost upon the site.

The remoteness of the site and the conformation of the hills upon which the quarries are located rendered it improbable that the locality was used for dwelling or for any other purpose than that of quarrying the potstone and roughing out the vessels. All tools found should, therefore, be quarry tools.

The absence of bowlder or other deposits of material habitually utilized by the aborigines gave additional simplicity to the quarry art, rendering it reasonably certain that all articles found pertained to the soapstone work; that all save those of soapstone had been carried in by the quarrymen.

As in the case of the quartzite quarries, no tools were found that could have been used in excavating the pits and detaching the masses of steatite; all were adapted rather to the work of sculpture—to the roughing out and shaping of the vessels.

The tools found may be conveniently divided into two classes—those improvised upon the spot for special and temporary use, and those of standard varieties brought from the villages and utilized

temporarily in the quarries. A vast majority are of the former class. They are, as a rule, quite rude and were derived from the vicinity of the quarry. They approach more nearly a palæolithic type than any other forms found in the Potomac region. Nothing more primitive is found in America. The hills and slopes in the vicinity abound in outcrops of vein quartz which break up into angular fragments. These are now so plentiful upon the neighboring fields as to make agriculture a burden. Such angular fragments were gathered for use in the quarries; some were already well adapted to use, whilst others were trimmed to better points and edges (Fig. 1). Quartzite boulders found sparingly upon the neighboring slopes were also worked into rude picks by flaking (Fig. 2).

A small number of angular masses of quartz were discovered that were not apparently adapted to any use and that showed no signs of having been used. They may be fragments of larger masses broken in use.

A few cobble-stones were found, but none showed very decided evidence of use as hammer stones, or otherwise.

It is not considered necessary to take further notice of specimens that do not show decided evidence of design or use, or that by their natural conformation seem to be especially well adapted to known uses.

The objects of quartz that show evidence of shaping by percussion are all of one type. They are thick angular masses weighing a pound or more; one end is brought to a short, sharp point, and the other is somewhat rounded as if to be held in the hand or hands for striking (Fig. 1). Of the same general shape are two picks made from quartzite boulders and resembling heavy pointed "turtle-backs" (Fig. 2.) In no case does the form of these tools suggest the attachment of a haft, although such attachment would probably be feasible in their present state.

Two small chisel-like tools were found in the main trench on the summit of the hill. They are of unique types, and we may fairly assume that they were made for use in the potstone shop. One is made of a black slate-like rock that has become gray on the surface through oxidation of some of its constituent minerals. In its general configuration it is much like the quartzite blades produced in the quarry shops of the District, but it differs from them in having a chisel-like point or edge (Fig. 3). This edge is somewhat oblique and shows but little evidence of use, although it should be ob-

served that chemical changes in the stone would tend to obliterate such evidence.

Another specimen (Fig. 4) is of gray slate, very slightly altered by chemical changes. It is rather rudely chipped along both sides, and the point has been made quite sharp by grinding and subsequent use. Properly hafted this little celt would have been a very effective tool in shaping the half-finished vessels. As it stands it is rather small for convenient use. Possibly it may have been hafted after the manner of an ordinary stone knife. Tools of this class are abundant on the quarry sites of Maryland and Virginia. They reach nearly a foot in length, and in cases have a polished chisel-like point at each end.

From the soil that filled one of the shallow pits on the south margin of the crest of the hill, a chipped quartzite tool of unusual shape was obtained (Fig. 5). It resembles the borers or perforators of the same material found on village sites, but is ruder and less symmetrical and was probably made especially for use in the trimming of soapstone vessels.

One of the most important finds made during the excavation at this place was a large grooved axe of the wedge-hafted type (Fig. 6). It was found in one of the shallow pits on the south margin of the hill-top, one foot from the surface, and resting upon the surface of the soapstone in place. There can be little doubt that this tool was used by the ancient quarrymen in dislodging, and perhaps in trimming, the masses of stone. Its edge shows considerable wear, apparently from use as a pick. Its weight and shape would make it a very effective tool. If proof were necessary that the workers of these quarries were Indians, the discovery of this object would seem to be satisfactory. Surface finds upon the sites of ancient soapstone quarries in Maryland include many of these grooved axes. In most cases they have been remodeled by flaking to fit them more perfectly for use as picks (Fig. F).

CONCLUSION.

The question in this connection that claims first attention is what correlations can be made between the soapstone quarries and the quartzite boulder quarries of the District. Are they all probably of one age and the work of one people, or are they separated by long periods of time and by marked differences in art characters?

It may be first observed that the two classes of quarries are located in the same valley and only one and one-half miles apart; that

they correspond as closely in extent of work and in appearances as could be expected if worked at one time and by one people. There are striking dissimilarities, but these are due to differences in the nature of the materials quarried and the relation of the quarries to adjoining formations.

It appears that the soapstone was not quarried to a depth equal to that of the quartzite bowlders, but it will be seen at a glance that the difficulties attending the working of the former are much the greater. With increasing depth the soapstone becomes firmer and more massive, and it is impossible with primitive tools to detach the necessary masses. The shafts must therefore necessarily be shallow. With the bowlders the difficulty does not increase with the depth in the same degree, and greater depths could be reached with comparative ease.

Again, it must be admitted that the boulder quarries exhibit more decided evidence of great age than do the soapstone quarries. In the former the pits are much more completely filled up and obliterated. This fact may, however, tend to lead to erroneous conclusions if the conditions under which the two classes of pits existed are not considered.

The deepest soapstone pits were not over four or five feet deep, but they were excavated in solid rock and upon the crests of hills, where there was absolutely no material to fall into them save the leaves from the trees. Such ancient pits as were not upon the summits were entirely or almost entirely filled up.

The cobble pits on Piny Branch were in all cases situated upon the slope of the hills, and were therefore directly beneath overhanging masses of loosely compacted sands and gravels and may have been more completely filled up in one year than the soapstone pits in a century.

On the other cobble quarry site, near the new observatory, some of the pits situated upon the hill-top and originally eight feet deep were not more than ten inches deep when first examined by us, but when we observe that the walls of these pits were composed of coarse loose gravel capped with sandy clay we must conclude that the chances are that they would be obliterated very much more rapidly than if the walls consisted of tough massive stone.

The character of the two sites corresponds very closely in this, that both are in the hills and so steep as to be quite unsuited for camping or dwelling. Both are therefore naturally free from village

refuse, and the tools found must for the most part, if not exclusively, consist of those actually used in the work of quarrying and roughing out the implements produced. In neither case has any tool been found that is not germane to the work of the quarries, and this correspondence is most significant, as archæologists will readily apprehend.

In the cobble quarries no tools of a durable material were needed save those found by thousands in the quarries. Carefully shaped hammer stones, polished celts, and grooved axes had no place in these quarries; no more place, as I have shown, had the finished tools of the classes here roughed out. A grooved axe, such as that found in the soapstone quarry, would be an effective tool in the work of quarrying soapstone, and it could be used without the least danger of breaking it. The chisels also are of types that resemble ordinary Indian work, but they also were especially adapted to, and no doubt especially made for, the quarrying of soapstone.

The only tools, then, that correlate the workers of these soapstone quarries with the Indian were not carried in aimlessly and lost, but were lost because there in use. It will not, therefore, be safe to say that because no traces of ordinary Indian tools were found in the boulder quarries the workers in these quarries were not Indians, for I have amply shown that such tools could not have been used, and hence they would stand small chance of being lost there. It may be emphatically stated that in none of the quarries has any trace of art been found that did not pertain directly to the work of the quarry.

If the correlation of the Indian with the workers in the soapstone quarries was necessarily dependent upon the loss of articles not germane to the work of the quarry, no such correlation could be made by any known evidence.

The nature of the work of shaping done in both classes of quarries has a close and significant correspondence. No single finished piece of work was found in either case. In the cobble quarries the blade was roughed out to a convenient shape for transportation and subsequent finish. In the soapstone quarries the pots were roughed out and carried away to be finished elsewhere. It is significant also that on many village sites in the vicinity quarry products of both materials are found freely and intimately associated.

A review, therefore, of the evidence shows many significant correspondences in the work of the two classes of quarries and no disagreements that require the assumption of wide differences in time, people, or culture.

WRITING MATERIALS AND BOOKS AMONG THE ANCIENT ROMANS.

BY A. P. MONTAGUE.

The subject may be logically divided into the following heads:

- I. The materials used as paper.
- II. The ink.
- III. The pen or pencil.
- IV. Books.

I. THE MATERIALS used as paper or in the place of paper were—

- (1). The thin rind of the Egyptian papyrus.
- (2). Parchment made of skins.
- (3). Wooden tablets covered with wax.

(1). In the most common use, especially in the writing of books, was the thin coat or rind (*liber*; whence the Latin word for "book") of the Egyptian papyrus. The Egyptian name of the plant from which the rind was taken was *Byblos* (Greek *βύβλος*; whence *βιβλίον*, *βιβλίον*, "book").

This papyrus plant or tree, found in swamps in many tropical countries, and especially in the valley of the Nile, grows to the height of ten or twelve feet. We learn (Plin., *Nat. Hist.*, XIII., 23) that different pieces of the rind, having been wetted in the water of the Nile, which, according to eminent authorities, has a glutinous property, were joined together; a layer of these pieces was placed flat on a board and a cross layer put over it; these were pressed together and afterwards exposed to the sun to be dried. These individual sheets were from 8 to 14 inches high and from 3 to 12 inches wide.

At one time the ancients wrote upon these sheets and then pasted them together at the sides in regular order; but in Pliny's time (A. D. 23-79) rolls of sheets pasted together ready for the writer were sold. In writing books an author could continue this pasting process until he made a book which occupied sheets stretching, when laid out, at least fifty yards, and there are Egyptian papyri rolls presented which are actually of this length. Dr. O. T. Mason of the U. S. National Museum informs the writer that he saw recently at Leyden

a roll of papyrus sheets fifty yards in length. But Roman authors usually divided a long work into several rolls, as a large book, if written on one roll, would have required pasted sheets extending 90 yards or more. Callimachus, the poet and librarian of 250 B. C., said μέγα βιβλίον μέγα καχόν, "a large book, a large nuisance." When the writing was finished and the sheets had been pasted, a stick was fastened to the last sheet and all the sheets were rolled into what was termed a *volumen* (*volvo, volvere*, "to roll up;" compare the Eng. *volume*). This roll made a cylinder, and the top and bottom were generally stained black. To the ends of the stick, called *umbilici*, were added knobs, *cornua*, which were highly ornamented. It should also be noted that the ends of the sheets were carefully trimmed and polished with pumice stone. The title of the book was written in red color on a piece of papyrus or parchment (*titulus* or *index*) which was attached to the *volumen*. It was the custom to then steep the roll in cedar-oil (*cedrus*) and to place it in a parchment case stained purple or yellow. The poet Martial (40-102 A. D.) calls this dress in which the book was covered "a purple toga" (*purpuræa toga*,—Mart., X, 93). Seneca (*De Tranq. Animi*, 9) and Martial (XIV., 186) inform us that the portrait of the author was often placed on the first page of the book. The ancient reader held the roll or book in his right hand, using his left hand to unwind as he read and to re-roll the part finished. Books were often kept in boxes called *capsæ*, generally cylindrical in shape, made usually of beech-wood. There were also *scrinia*, "chests" or "boxes," in which books, letters, papers, etc., were kept.

Long before the time of Herodotus (B. C. 484), as we learn from that author himself (V., 58), the Egyptian papyrus was known to the commercial world. He wrote as follows: "Moreover, the Ionians, from ancient time, call books made (even) from papyrus parchments, because formerly, from the scarcity of papyrus, they used the skins of goats and sheep; and even at the present day many of the barbarians write on such skins."

That papyrus was widely used in the western part of Europe we know, not only from reference in Latin authors but from the fact that many rolls of papyri were found at Herculaneum, and that paintings of them were discovered at Pompeii. Prof. Gow, an eminent Cambridge scholar, states that a few fragments of Homer, Thucydides, Euripides, and Sallust are extant on broken papyrus leaves or sheets.

The paper (*charta*) made from the papyrus was of different grades or qualities. The finest was called after the Emperor Augustus, the second grade after his wife Livia, the third was termed Hieratica (*ἱερατικός*, "devoted to sacred purposes"), because it was used in sacred writings, originally in those of Egyptian priests. As the manufacturers or the dealers were politic men, and believed in making their positions strong with the powers that were, we hear later on that the best paper was called after Claudius, the Emperor. One kind, called *Emporetica* (*ἐμπορικός*, *belonging to commerce or merchants*), not being suitable for writing paper, was used by merchants to wrap parcels.

(2). Parchment made of skins.

Parchment (*membrana*) is said by some writers to have been invented by Eumenes II. (B. C. 263), King of Pergamus, a city of Mysia, now *Bergamo*, but this is clearly an error, because more than two centuries before Herodotus alluded, as we have seen, to skins as in use before his time and common in his day. Eumenes II. undoubtedly introduced some improvements in preparing skins for writing purposes while he was engaged in collecting and maintaining his great library of 200,000 volumes, afterwards given by Antony to Cleopatra and carried to Alexandria to form a part of the wonderful library there. The word parchment is derived from *Pergamēna*, "belonging to Pergamus," as at that city sheep skin and goat skin had probably their first distinctive use as materials in writing books. Eumenes was led, it is related (Plin., *Nat. Hist.*, XIII, 21), to use and improve skins as paper by the fact that Ptolemy Epiphānes, King of Egypt, fearing that Pergamus would rival Alexandria as the book centre of the world, had forbidden the export of papyrus. Parchment and papyrus sheets seem to have been almost the only materials upon which *books* were written among the Romans, the former coming into use for books (having previously been used for note-books) about 90, A. D., and gradually taking the place of papyrus. Prof. Lewis Evans, of Oxford, the scholarly translator of the satires of Juvenal, Persius, and Lucilius, says: "The manufacturer of parchment was termed *Membranarius*. The parchment, after being rendered smooth by rubbing with pumice, was flattened with lead; and it was capable of being made so thin that the whole of the 'Iliad' written on this material, was inclosed within a walnut-shell!" Quintilian (X., 3) writes: "For persons of weak sight parchment is much better (than waxen tablets); but the rapid flow of

thought is checked by the constant necessity for dipping the pen in ink. Parchment sheets were pasted together and rolled in the same manner as those made from the papyrus plant. Parchment possessed certain advantages over papyrus, in that it was thicker and writing could be placed on both sides, though, originally, the back of the parchment was not used and was stained a saffron color; it was more durable, as papyrus was apt to be broken; and the same piece could be used several times. This fact gave rise to the singular custom of erasing or washing out the writing on parchment and of using it as new material. Parchment thus washed was termed *palimpsestus* ("scraped again"), palimpsest. In reference to this custom Cicero (*Ad Fam.*, VII., 18, 2) writes his lawyer friend, Trebatius, as follows: "I commend your economy because you (wrote) on palimpsest; but I wonder what was on that little piece of paper which you were willing to destroy rather than not write this (letter; lit., *these things*) to me, unless (it was) perchance your own legal forms. I can't think that you are destroying my letters in order that you may put yours (on the paper)." In other words Cicero wondered what could be less important than a friendly letter.

Several remarkable facts are given by Dr. Gow in connection with this custom. The monks of the Middle Ages, in their desire to write the lives of their saints, washed and scraped old parchments which had fallen into their hands. Traces of original writing were long afterwards discerned under and between their lines, and, by the use of certain chemical preparations these first writings were brought out so that they were capable of being deciphered.

In 1816 Niebuhr came upon a MS. at Verona which contained certain writings of Jerome. Detecting marks of an older writing, he went to work and soon restored the ancient MS., which proved to be the famous legal treatise of Gaius, called "The Institutes," which had long been considered lost and had been for many years known only through references of other authors. Strange to say, about one-fourth of this entire MS. *had been scraped before*, and thus it was *doubly palimpsest*. (See Göschen, Report to the Academy of Berlin, Nov. 6th, 1817.)

The best MS. of Plautus was found at Milan underneath portions of the Old Testament; a part of Livy was found to be covered with the "Moralia" of Gregory the Great. Late Greek MSS. of classical authors have been found covering portions of the Bible. A MS. of Sophocles, copied in 1298, overlay an uncial MS. of the Septuagint. This MS. is now preserved at Florence.

Parchment leaves were often bound together and sewed at the back into a binding in the modern way. Such a book was at one time called *codex* or *caudex*, although this word had earlier and later meanings, which will be given.

As guides to the writer's pen, lines were drawn with lead on the parchment and these left faint impressions.

(3). Wooden Tablets covered with wax. The word *tabulae* means properly "planks" or "boards," then gaming-tables, pictures, etc.; but its most general meaning in ancient Rome was *tablets used for writing*. It referred to tablets of any kind, stone, metal, or wood, nearly always the last. These *tabulae*, in this sense, were pieces of wood, generally beech or fir, sometimes citron-wood (even ivory was used occasionally), covered with wax, in shape oblong. The outer sides of these tablets were of wood, only the inner sides being covered with wax. The two pieces of wood were fastened at the back with wires as hinges and could be opened and shut like our books. To prevent the wax of one tablet from rubbing against that of the other there was a raised margin around each.

Certain tablets called *pugillares*, from *pugillus*, "a handful," were very small and took their name from the fact that they could be held in the hand. Pliny the Younger in a letter (I. 6) to the historian Tacitus writes that he went on a wild-boar hunt, but that he took no spear or lance, only the hunting-nets and his pencil and hand-tablets, on which he diligently wrote while waiting for the boar to run into his nets. He urges the great historian to take along on his hunting expeditions a bread-basket and a little bottle, and not to forget the note-books, assuring him that he will find that Minerva keeps Diana company in the forests and mountains. These waxen tablets were used for almost any purpose when great length was not desired. Their chief use was in correspondence. When the writer had completed a letter, he bound the tablets together with a strong thread, which he tied in a flat knot, upon which he placed wax and then stamped this with the device on his signet-ring (*signum*). When letters were written by secretaries—the usual way—this was the only signature.

As is seen in an ancient painting of Love (*Amor*) giving a letter to Polyphemus, love-letters, called *vitelliani*, were written on tiny tablets (Martial, XIV. 8). Waxen tablets were also used in writing wills and other legal documents, and, when so used, the outer edges were pierced with holes, through which a triple thread was passed,

upon which a seal was put. This was done to guard against forgery, and any legal paper, especially a will, not thus secured was worthless. Among the many other uses of these tablets may be mentioned that of keeping accounts of sums received and disbursed. The term *codex* (or *caudex*) was applied to these tablets when bound together. In Cicero's time this name was also given to a tablet on which was written a bill to be offered to a voting body. Under the Emperors *codex* was used for any collection of laws (Cf. Eng. *code*), as the *Codex Justinianus*.

There is an interesting account of two ancient waxen tablets in an excellent state of preservation found in gold mines in and near the village of Abrudbánya, in Transylvania. These *tabulae* consist of three tablets each. One is of fir-wood, the other of beech-wood, each about the size of a small octavo. The outer parts are of plain wood; the inner are covered with wax, now grown almost black, and have raised margins. The middle tablet, also with raised margins, is covered with wax *on both sides*. The edges are pierced for the thread. On one of these tablets are some Greek letters, followed by certain unknown characters. The other tablet contains writing in Latin, which refers to some business connected with a *collegium* ("body" or "corporation"). The date, given by consuls, is 169 A. D. It is written *from right to left*, the writing beginning on what we would call the 4th page and ending at the bottom of the 3d. These waxen tablets had, in addition to the name *tabulae*, the appellation of *cerae*, and the pages were called *prima cera*, *secunda cera*, etc., "1st page" (or "leaf"), "2d page," etc.

Waxen tablets were used in Europe in the Middle Ages. The oldest of these mediæval tablets, of which we know, belongs to the year 1301 A. D. It is now in the Florentine Museum.

It may be added that some late MSS., mostly in Greek, are written on paper, a Chinese invention, brought to Europe by the Arabs of Spain. Paper made of cotton was called *bombycina*; linen paper, *charta* (Gow).

II.—THE INK.

The first mention of *Ink* among the Romans is made by Plautus (254-184 B. C.) in his play called "The Ghost" (*Mostellaria*, Act I., sc. III., 102), where he has an ironical reference to the attempt to make ivory white *with ink*. The next author who mentions ink is Cicero (106-43 B. C.), who, in a letter to his brother (*Ad Quint.*

Fr., II., 15) says: "The matter will be discussed with a good pen, well-prepared ink, and smooth paper. * * * I am in the habit of using whatever pen comes into my hand, as if it were a good one." An eminent scholar of Cambridge, England, whose researches have been careful and valuable, informs us that the ink used in writing on papyrus was made of lamp-black and gum, and that for parchment of gum and oak-galls. Pliny writes of the making of ink in his time as follows: "It is made of soot in various ways with burned resin or pitch; for this purpose they have built furnaces that do not permit the escape of smoke."

He also states that a kind of ink was made by boiling and straining the dregs of wine. This author further states that mice were kept from manuscripts if they were written with ink with which wormwood had been mixed. There can be no question as to the excellence of the ink used among ancient nations, when we read in the report of the British Museum on Egyptian Antiquities (Vol. II., p. 267) the statement that the color and brightness of Egyptian ink remain to this day, as is attested by certain specimens of their papyri, and when we recall the fact that at Herculaneum was found an inkstand containing ink which had become as thick as oil, but which could be used at the time of discovery (Winckelmann, Vol. II., p. 127).

The satirist Persius (III., 13 *et seq.*), writing of the troubles of a teacher with his pupil, says: "Now his book and the two-colored parchment cleared of hair, and paper and the knotty reed are taken into his hands. Then he complains that the ink, grown thick, clogs in his pen; then that the black *ink* disappears altogether if water is poured into it; then that the reed makes blots with the drops being diluted." From this quotation we learn two facts: that the Romans cleared and thinned their ink by pouring in water, and that the black matter emitted by the cuttle-fish, called *sepia*, was sometimes used as ink (Leverett's *Juvenal and Persius*, p. 239; Cicero, *De Nat. Deorum*, II., 50). The ancient Romans had, in addition to black ink, red ink made of *minium* or red lead, a pigment consisting of two atoms of the protoxide of lead and the peroxide, which was used in writing the titles and beginnings of books. Ink made of rubrica ("red ochre," hematite) was also used for these purposes, and in post-Augustan times, as this rubrica ink was used in writing the headings of laws, the law itself was termed *rubrica*, "rubric" (Quint., XII., 3). Roman Emperors and their near relatives wrote

their signatures with an expensive red ink which the law forbade others to use. If the Emperor was under age his guardian wrote with green ink. Dion Cassius tells us that Crassus, in his ill-starred expedition against the Parthians, had his banners marked with letters of purple ink. Cicero in his fourth Verrian oration and Suetonius in his "Life of Augustus" inform us that letters of gold and silver, or, more probably, letters covered with gilt and silver, were placed on pillars and monuments. Suetonius in the "Life of Nero" mentions the fact that one part of the poems which Nero recited at Rome was written in gilt letters. The Romans had also an invisible or *sympathetic* ink, which could be brought out only by heat or by the application of some chemical preparation. Ovid (*Art. Am.*, III., 627 *et seq.*) said that lovers might use fresh milk as their ink; that this would be invisible until brought out by the sprinkling of coal-dust. Pliny says that the milky sap of certain plants may be used in the same way. From the specimens found at Pompeii we know the shape and appearance of the ancient ink-stand (*atramentarium*). These specimens are both single and double, one well for black ink and the other for ink of some other color, probably red. In shape they are round or hexagonal. They have covers to keep out dust.

III.—THE PEN OR PENCIL.

Cicero in a letter to Atticus (VI., 8) and Horace in the 447th line of his "Ars Poetica" refer to the pen which the Romans used with papyrus and parchment. It was termed *calamus* (*κάλαμος*) and was, as Dr. Gow says, of the same form as our old-fashioned quill pen. We learn from Pliny (*Nat. Hist.*, XVI., 36, 64) and Ausonius that the best reeds from which these pens were made came from Egypt and Gnidus, a Doric city of Căria. When the pen became blunt it was sharpened with a knife made especially for this purpose, called *scalprum librarium*. The pen was split like our pens, and hence the name *calamus fissipēs*, "cloven-footed pen" or "reed" (Ausonius, VII., 49). This reed is even now, Professor Evans says, used as a pen in the East. For use with waxen tablets the Romans had an iron instrument called *stilus* (*γραφίον*), sharpened at one end for scratching on the wax, flat and circular at the other end for erasing, when it was desired, what had been written. Ovid and Suetonius tell us that this *stilus* was called *graphium* (Greek *γραφίον*) and from Martial (XIV., 21) we learn that it was placed, when not in use, in a case called *graphiarium*.

IV.—BOOKS.

From the time of Cicero there was a regular trade in books. Dr. Gow is the authority for the statement that the publisher either paid the author a royalty on each copy sold or gave him a fixed sum for the book. When a book was likely to be in demand, the author's copy was dictated to a large number of copyists (*librarii*) at once, 1000 copies sometimes being made. These copyists were slaves and often foreigners; hence many mistakes were made which sorely tried the patience of the author. Cicero, Strabo, Martial, and others complain of these blunders. The author himself often revised copies made by scribes, especially when he desired to present his books to friends. Booksellers (*bibliopola*) had stores in many parts of Rome, but especially in a section called Argiletum (Harpers' Lat. Dict.). They advertised their books by placing lists of them at their doors. Among the famous booksellers were the Sosii in Horace's time and Tryphon in the time of Quintilian and Martial. The prices of books, of course, varied; some could be bought for one *denarius* (20 cents) apiece; others, according to popularity, size, or other varying conditions, especially the conscience or lack of this element on the part of the seller, were sold at five *denarii* (one dollar), or for a larger sum.

People too poor to buy books were not deprived of the privilege of reading them, as Rome had many public libraries. From the beginning of the reign of Augustus to the end of that of Hadrian, twenty-nine libraries for the people were founded. The first public library was instituted in the time of Augustus, by Asinius Pollio, consul, man of letters, and patron of literature, who not only established this library but also collected for the public eye many famous statues by Praxitéles and other masters. Virgil in his fourth Eclogue and Horace in many places testify their regard for this eminent man who did so much for men of genius and for any workers in literature who sought and deserved his aid. It was Pollio who instituted the custom of an author reading his productions to learned and accomplished men, invited to meet him with a view to hear and to criticise, but, according to the author's wish, to do as little of the latter as possible, if the criticisms were not to be laudatory. This custom at last became a farce and, worse still, a bore, to everybody. Juvenile, in his famous first Satire, lashes with unsparing hand the miserable so-called poets who drove him to write

satire by their public and private recitals. Private individuals collected books, and certain private libraries, as those of Cicero and Atticus, who is represented by Cicero as sitting in his cosy library under the bust of Aristotle, were the most attractive portions of their palatial homes. Libraries, both public and private, were adorned with portraits and busts of eminent men and with statues and statuettes of Minerva and the Muses. A library entirely furnished was found at Herculaneum. It was a small room, so small that a person standing in the middle of it could touch both sides.

As the works of certain Roman authors were used in schools as textbooks, many editions were written. In Juvenal's time the works of Horace and Virgil and a part of Livy were favorite school books. As certain authors did not take with the public or with teachers, their works were not re-written, and thus their productions fell out of use and out of sight forever.

THE INHABITANTS OF THE BISMARCK ARCHIPELAGO.—An article by Count Joachim Pfeil, entitled the "Land und Volk im Bismarck Archipel," recently published in the "Verhandlungen" of the Berlin Geographical Society, contains many interesting observations on this comparatively little known race of cannibals. The name Bismarck Archipelago is a purely political designation applied to the group of Melanesian Islands under the German protectorate, including New Pomerania (New Britain), New Mecklenburg (New Ireland), New Hanover, Bougainville, Choiseul and Isabelle. The latter islands are really part of the Solomon Islands. The inhabitants of these islands belong to what is really one race, but show marked differences on the different islands.

For instance, the New Pomeranian is a big, powerful, muscular man, with very little of the grace so often characteristic of black races. His complexion is that of a light negro, with an admixture of somewhat more red. His hair is curly, his mouth coarse and wide, his nose flat, and his countenance almost expressionless. The New Mecklenburger, on the other hand, though of about the same complexion, is of slighter and more elegant build, his features are far more pronounced, and his expression is wide awake and crafty.

Among other interesting things the article contains detailed descriptions of several festivals and several interesting tales.

INDIAN ORIGIN OF MAPLE SUGAR.

BY H. W. HENSHAW.

For a long time it was a popular idea that the Indian was a savage with all the traits that pertain to savagery, and with few or none of the instincts that are supposed to inhere in civilized man. This supposition has gradually given way to a clearer apprehension of the status of the Indian, as his achievements in one direction and another have been recognized and studied. Far from being a wandering savage dependent solely upon his skill as a hunter and fisher, it has been ascertained that over nearly all the United States he was practically sedentary, and that east of the Mississippi all the tribes, and not a few west of that river, depended for a livelihood more upon the results of agriculture than upon any other one source. Moreover, the agriculture practiced by the Indian has had tremendous and far-reaching consequences to civilized man. For the most important product of the Indian's tillage was maize, and while we may be in some doubt as to the exact region in which maize originated and probably shall never know the tribe or family which first cultivated it, there is no ground to question the fact that it was discovered by the Indians in its wild state, its value as a food ascertained by him, and by him it was cultivated for so long a period that it has become so changed as possibly to defy identification in its wild state, if, indeed, it still exists in a state of nature. Taken from the Indian's hand, it has been fostered by a more skillful culture till it has become one of the most important of food plants and helps to sustain millions of human beings in every grade of culture the world over.

Though the most important gift of the Indian to civilization, maize is not his only one. Pumpkins, beans, one of the most valuable cotton plants, and tobacco, the latter of which has enslaved man to the uttermost parts of the earth, are also gifts from the Indian to his conqueror.

It might not be very easy to point out just what benefits the Indian has received from his civilized brother in return for the above and other gifts. Perhaps, if he has received little the fault may not be

entirely that of his civilized brother, though there are philanthropists who appear to think so. However, it is not the purpose of the present paper to discuss the Indian's success or failure in adjusting himself to the requirements of advanced civilization, but to present some evidence tending to show that there is still another important product for which civilized man is indebted to the Indian.

Allusion is made to Maple Sugar, the origin of the manufacture of which appears to be in doubt in the minds of some.

During the last census year (1880) more than thirty-six millions of pounds of maple sugar were produced in the United States, and more than a million gallons of maple molasses, which together had a value of perhaps \$4,000,000.

These figures show that the maple sugar industry is a by no means contemptible one, and, although for the practical purposes of to-day it matters not whether the art of its manufacture originated with the Indian or European, its origin is by no means unimportant to the student desirous of ascertaining Indian arts that he may have a clear idea of the position attained by the Indian race in its struggle upwards.

Considering the great familiarity of the Indians with the natural edible products of America, and the general ignorance of the European on this subject, it is fairly to be inferred that the *a priori* likelihood of the discovery of the properties of the maple sap is all in favor of the Indian. If maple-sugar-making in the Northern United States preceded the arrival of the European and if the latter derived the art from the Indians, it is reasonable to expect to find statements to this effect in the early French narratives. On the other hand, it is to be said that if the discovery of the saccharine juice of the maple and the simple art of boiling it down to sugar were made by Europeans, it is even more probable that this fact would have been duly recorded by the early chroniclers. I am not prepared to say whether the earliest chronicles, say 1600-1675, contain information as to the Indian or European discovery of maple-sugar-making. If the matter is not referred to, its absence cannot be taken as conclusive either as to aboriginal or European origin. Many customs of the Indians far more important than this received but the briefest mention by the early narrators or are not mentioned at all.

Most of the notes presented herewith were collected years ago in connection with the general subject of Indian food, and, although it is not pretended that they are exhaustive, they seem sufficient to

indicate pretty clearly that maple-sugar-making is an aboriginal industry, and perhaps render reference to earlier authorities unnecessary.

The first reference which I happen to have occurs in Joutel's Journal, which is to be found in Margry Découvertes, III, 510. A very free translation of the same appears in French Hist. Coll. La., I, 216, 1846.

A fair translation of the passage is appended, although it throws no light upon the question of the origin of sugar-making:

"We had not much meat, but Providence furnished us a kind of manna to add to our Indian corn, which manna was of a juice which the trees eject in this season, and notably the maples, of which there are many in this province and which are very large. In reference to this we made large incisions in each tree, to which we applied a vessel and a knife below the incision to conduct the liquor, which properly is the sap of the tree, which, being boiled, as it diminishes becomes sugar. We used this water to boil our Indian corn or sagamite, which gave it a rather good taste—that is, a little sweetened. It seems that Providence provides for everything, for, as there are no sugar-canes in these provinces, the trees furnish the sugar; at least I have seen some which was excellent. It was more reddish than ours—that is, what is used in France—but nearly as good."

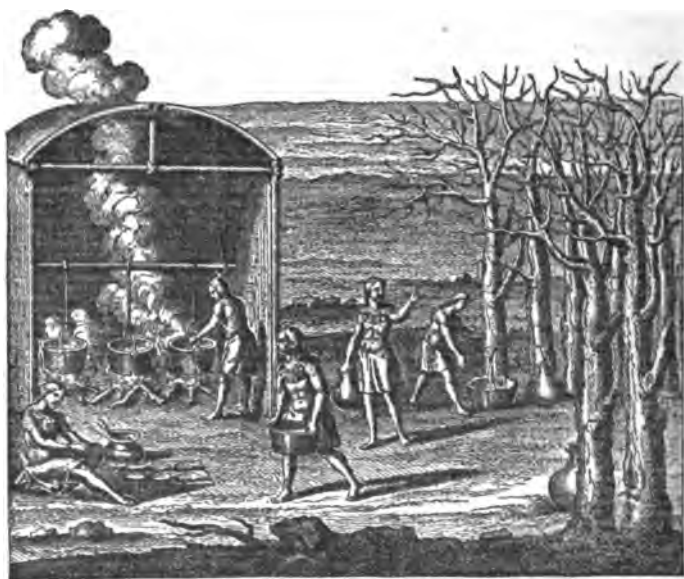
The next reference is to be found in Lafitau, Vol. II, 153, 1724, the period of the author's observation dating back to 1700-5. He says:

"In the month of March, when the sun has taken a little strength and as the trees enter into sap, they, the Indians, make with their hatchets transverse incisions in the trunk of the trees, from which trickles in abundance a water which they receive in large receptacles of bark. They afterwards cause this water to boil over the fire, which consumes all the watery matter, and which thickens the rest into the consistency of syrup, or even into cakes of sugar, according to the degree of heat to which they subject it. There is no further mystery to this. This sugar is a very good pectoral, and is admirable in remedies; but, although it is more healthy than that of the canes, it is not agreeable, nor has it delicacy, and nearly always has a burnt taste. The French make it better than the Indian women, *from whom they have learned how to make it*; but they have not yet been able to whiten or to refine it."

So far as Lafitau's knowledge goes, his statement of the derivation of the art from the Indians is direct, if not conclusive. He

says that the French learned it from the Indians. Upon just what evidence he makes the statement does not appear, but he was unusually well acquainted with aboriginal habits, and probably did not overlook the fact that in the 100 years of French contact preceding his own observation there was plenty of time for the French to have taught the art to the Indian. His statement of its aboriginal origin would seem to be entitled, therefore, to considerable weight.

A reproduction is here given of Lafitau's curious illustration of the Indian method of tapping the maple trees, collecting the sap, and boiling it down. For the kettles employed in boiling the sap the Indians are evidently indebted to the French trader; otherwise the process indicated appears to have been purely aboriginal.



Indian sugar-making. Reproduced from Lafitau.

Bossu, writing somewhat later, in 1756, is equally explicit as to the source of the art of sugar-making. He says (*Travels through Louisiana*, Vol. I, 188, 1771): "After the first ceremonies were over, they brought me a calabash full of the vegetable juice of the maple tree. The Indians extract it in January, making a hole at the bottom of it, and apply a little tube to that. At the first thaw

they get a little barrel full of this juice, which they boil to a syrup : and being boiled over again, it changes into a reddish sugar, looking like *Calabrian manna*. The apothecaries justly prefer it to the sugar which is made of sugar canes. The French who are settled at the *Illinois* have learnt from the Indians to make this syrup, which is an exceeding good remedy for colds, and rheumatisms."

Keating (Exp. to the Source of St. Peter's River, Lond., 1825, Vol. I, p. 114) also offers some satisfactory testimony from the Indian's side of the question. The quotation, though evidently a paraphrase of the language used by the Indian, is given in full, as it contains the Indian's method of sugar-making: "We are informed, that they profess to have been well acquainted with the art of making maple sugar previous to their intercourse with white men. Our interpreter states that having once expressed his doubts on the subject in the presence of José Renard, a Kickapoo chief, the latter answered him immediately, with a smile, * * * 'Wherefore should we not have known as well as they how to manufacture sugar? He has made us all, that we should enjoy life. He has placed before us all the requisites for the support of existence—fire, trees, &c. Wherefore then should he have withheld from us the art of excavating the trees in order to make troughs of them, of placing the sap in these, of heating the stones and throwing them into the sap so as to cause it to boil, and by this means reducing it into sugar?' " Keating adds: "In this reply of the Kickapoo we have a brief sketch of the rude process practised by the Indians in the preparation of the maple sugar. Previously to this they had learned the art of making and using pottery, but had abandoned it for the purpose, as Metea told us, of using wooden troughs, and hot stones; perhaps because their pottery did not stand fire well. The evaporation resulting from the action of the hot stones produced a crystallization of sugar in the trough. Their process was a tedious and imperfect one, which probably required much time before it could be improved." * * *

The Kickapoo themselves would thus seem to have believed that the art was wholly their own, or at least to have had no knowledge of its derivation from the European.

Moreover, the aboriginal method here indicated seems of itself to offer excellent evidence that sugar-making was an aboriginal art. Had it been known to the Indians through European instruction only, its manufacture would in all probability have been ac-

accompanied by the utensils of civilization. The method of boiling described above, viz., boiling in bark or wooden vessels by means of heated stones, seems to have been the usual one among the Indians, at least in the regions remote from civilization. It was, of course, at once superseded by the use of metal kettles where these could be obtained, since boiling the sap by means of heated stones must have been tedious and wasteful, and, as Keating remarks, the earthen vessels manufactured by the Indians were hardly capable of standing the necessary great and long-continued heat.

Allusions to the manufacture of sugar by the Indians are not uncommon in early colonial times, but most authors appear to have taken it for granted that it was an Indian art, and so have passed it by with a word. Col. Smith, in *Drake's Ind. Captivity*, 1850, alludes to it several times, and on page 197 gives the following interesting account of its manufacture and use by the Caughnawaga on the S. E. shore of Lake Erie: "In this month [February] we began to make sugar. As some of the elm bark will strip at this season, the squaws, after finding a tree that would do, cut it down, and with a crooked stick, broad and sharp at the end, took the bark off the tree and of this bark made vessels in a curious manner that would hold about two gallons each. They made above one hundred of these kind of vessels. In the sugar tree they cut a notch, sloping down, and at the end of the notch stuck in a tomahawk; in the place where they stuck the tomahawk they drove a long chip, in order to carry the water out from the tree, and under this they set their vessels to receive it. As sugar trees were plenty and large here, they seldom or never notched a tree that was not two or three feet or over. They also made bark vessels for carrying the water that would hold about four gallons each. They had two brass kettles that held about fifteen gallons each and other smaller kettles in which they boiled the water. But as they could not at times boil away the water as fast as it was collected they made vessels of bark that would hold about one hundred gallons each for retaining the water, and, though the sugar trees did not run every day, they had always a sufficient quantity of water to keep them boiling during the whole sugar season.

"The way we commonly used our sugar while encamped was by putting it in bear's fat until the fat was almost as sweet as the sugar itself, and in this we dipped our roasted venison." On p. 215 he adds one detail in respect to its manufacture which seems to me to

be peculiarly primitive. "We had no large kettles with us this year, and they made the frost, in some measure, supply the place of fire in making sugar. Their large bark vessels for holding the stock water they made broad and shallow, and as the weather is very cold, here it frequently freezes at night in sugar time, and the ice they break and cast out of the vessels. I asked them if they were not throwing away the sugar. They said no; it was water they were casting away. Sugar did not freeze and there was scarcely any in that ice."

The same method, however, seems to have been well known to the whites of later times, who employed it with success, and also the method by evaporation without the use of heat. (See Rush in *Trans. Am. Phil. Soc.*, 69, 1793.)

In *League of the Iroquois*, p. 369, Morgan speaks of sugar-making and states: "Whether they learned the art from us or we received it from them is uncertain. One evidence, at least, of its antiquity among them is to be found in one of their ancient religious festivals, instituted to the maple and called the Maple Dance." The evidence here adduced in favor of its antiquity seems important, since it is not to be supposed that a festival would have been originated in honor of the maple unless the art of extracting its most important product had long been known. As will be noticed, the Ojibwa also had a maple-sugar festival, as probably also other tribes who manufactured it, and it is scarcely to be doubted that such tribes had also myths accounting for the origin of the maple tree and explaining the mythic means by which they became possessed of a knowledge of the properties of its sap and of the manufacture of the latter into sugar.

Maple sugar was, in truth, more than a mere luxury to the northern tribes, and Heny, in his *Travels, 1760-1776* (p. 70, 1809), states: "Though, as I have said, we hunted and fished, yet sugar was our principal food during the whole month of April. I have known Indians [Ojibwa] to live wholly upon the same and become fat." Rush states that the Indians "mix a certain quantity of maple sugar with an equal quantity of corn dried and powdered in its milky state. This mixture is packed in little baskets, which are frequently wetted in travelling without injuring the sugar. A few spoonfuls of it mixed with half a pint of spring water afford them a pleasant and strengthening meal." (*Trans. Am. Philos. Soc.*, 74, 1793.)

Maple sugar was, in fact, part of the annual supply of food, and the maple groves were regularly resorted to for its manufacture.

Though the above evidence, so far as it goes, seems to decidedly favor an aboriginal origin for maple-sugar-making, it appears to me of less consequence than certain linguistic testimony which may be cited. But first a word as to the range of the sugar-producing maples.

The sugar maple (*Acer saccharinum*), though flourishing best in a northern climate, yet possesses an extensive range in the United States, extending south along the Alleghanies to northern Alabama and west Florida, west to Minnesota, Nebraska, eastern Kansas, where rare, and eastern Texas. (For range of this and other species see Sargent, Vol. I, Tenth Census, 1884.) There are two other trees from which sugar is occasionally made, viz., the Silver Maple (*A. dasycarpum*) and the Box Elder (*Negundo aceroides*). I doubt not that the latter trees were tapped by the Indians for sugar, but I am unable to say positively that such was the case. If the range of the two latter species be taken into consideration, it is evident that one or more of the sugar-producing trees must have been known to all the tribes north of the Gulf States and as far west as the plains, and even in the Rocky Mountains. The manufacture of maple sugar, however, appears to have been chiefly limited to the northern tribes, especially to those of New England and the region of the Great Lakes, though the Indian languages quoted below show that the knowledge of the sap-producing properties of the tree, if not the knowledge of maple sugar, was by no means confined to these sections.

Certain it is that a knowledge of the sap-producing properties of the tree could not long have preceded the knowledge of maple sugar. The sap would naturally first be used as a beverage; but the discovery of the art of boiling it down could not have long been delayed, though the freezing process may have been first in order of time.

When European novelties were introduced among the Indians there were two methods of naming them. Frequently, as in the case of sugar below cited, they did their best to adopt the foreign name. This was particularly true in California, where Spanish names for almost every European introduction were incorporated into the native tongues. Tonty (1688) tells us that the Cadodaquis on Red River of Louisiana called the horse "cavali," Spanish caballo.

Many tribes, however, applied names of their own coining, deriving them from the names of objects most nearly resembling the object to be named. A familiar example is offered by the Dakota name for horse. As the only animal domesticated among the Indians was the dog, the Santee and Yankton name for which is Shunka, the horse was called by the Santee, Shunk-tankka, big dog; Yankton, Shunka wakan, mysterious dog.

Again, the Cherokee, as Mr. Mooney informs me, before they met the European, extracted their only saccharine from the pod of the honey locust, using the powdered pods to sweeten parched corn and to make a sweet drink. Their name for Honey Locust was Kùlsétsi, which name they applied also to the sugar of civilization.

Bearing the above facts in mind, it is a fair inference that if investigation shows that the Indian name for European sugar is the same as, or a derivative from, the name for maple sugar, and especially if the name of the latter be derived from the name of maple tree, we can hardly expect to find better evidence of the fact that maple sugar was a truly aboriginal production.

Frequent allusion is made in Tanner's *Captivity* to the manufacture of sugar by the Ojibwa, and on p. 294 (James Ed., N. Y., 1830) the Ojibwa term for Sugar Maple is given as Nin-au-tik, which is rendered "our own tree." The compound may possibly be from *mitig*, tree, and *nin*, our. (See Baraga *Otchipwe Grammar*.) It is, however, probable that Tanner's etymology is faulty and that the true derivation is given below. The River Maple is called *She-she-gum-maw-wis*, which is interpreted "sap flows fast." This etymology is also significant, since it clearly implies the ancient derivation of the tree's name from its sap. It is probable that the Indian's knowledge of the flow of the sap was had by the practice of tapping the trees for the purpose of sugar-making.

The Menomini name for the sugar moon, probably March, is given (p. 321) as *Sho-bo-maw-kun ka-zho*. It is very unlikely that the Indians would give a name to the sugar month unless sugar-making was of respectable antiquity among them, and was, moreover, aboriginal.

A letter from Mr. Beaulieu at White Earth, Minnesota, in response to a letter of inquiry, contains interesting and valuable information in regard to sugar-making among the Ojibwa, and I therefore take the liberty of quoting parts of it. He gives the Ojibwa word for maple sugar as *Zeence-zee-bah-quod*, pronounced *sen-se-pah-qwod*.

(Compare this with the Cree term below.) Derivation Zeence-zee, squeezed or drawn from; bah-quod, stick or wood. Hence the meaning, drawn from wood, or squeezed from wood or stick, which applies to the sap and the manner in which it is drawn from the tree by tapping in the spring.

Weesh-ko-bun is another term often used by the Indians, and more properly applies to the saccharine quality of sugar than the former word, as it refers to something palatable and grateful to the sense of taste.

Enin-ah-tig weesh-ko-bun is also employed. Enin, man; ah-tig, wood or stick; weesh-ko-tun, sugar. Hence, man stick sugar. This etymology contains a metaphorical reference to the manner the sap flows from the tree, as curious as it is suggestive. Doctor Hoffman informs me that this name particularly applies to sugar derived from the *Acer nigrum*, now considered as a variety of *A. saccharinum*, as the Indians say that the flow of sap from this tree is more plentiful than from any other.

Mr. Beaulieu states that the Ojibwa have a myth or deity connected with sugar. He also gives Zeence-zee-bah-quod-o-kay-ge-zis as the name for the sugar moon—March and April—adding that these are sometimes called Pay-bok-quay-dah-ge-mid, breaking snow shoe month.

He presents the following interesting facts with reference to the Ojibwa maple-sugar festival: "It has been and is yet with many the custom to join in a feast or sugar festival in the spring—that is, when the first sugar is made. The sugar-makers are invited to a lodge prepared for the occasion by the medicine man, who, when all have assembled, takes a small portion of the old sugar of the season before and the new sugar, mingles it together, at the same time muttering a prayer of thanks, and then hands a little to all who are present. Then he proceeds to thank, in a loud voice, the Great Spirit or Giver-of-Life for his good-will and invokes his aid and kindness to grant the a-nish-in-ah-bag (inferior braves or beings) a good and bountiful sugar harvest, etc. After this all are invited to partake of the feast prepared for the occasion, consisting, generally, of wild rice and game, etc., etc."

Lacombe, in Dictionnaire de la Langues des Cris (p. 254), gives the Cree name for sugar as Sisibâskwat, which is clearly a derivation from Sisibâskwatâtik, maple tree (p. 135). It is important to notice that the Cree distinguished their own sugar from the white

sugar of the European, calling the latter Sokaw (p. 254), which is evidently an attempt to pronounce the French or English word.

Mr. Hewitt informs me that the 'Tuscarora word for sugar is U-rě'-ná'-kri', which signifies tree sap. It would thus seem that even in this tribe, which lived comparatively far south, the knowledge of the product of the maple tree must have antedated the knowledge of European sugar, though the North Carolina home of the tribe could scarcely have furnished the means for extracting the sap, at least, in any quantity.

Making due allowance for consonantal changes, the Oneida seem to have the same word for sugar—O-lofi-da'-ke-li'.

Mr. Dorsey gives the Omaha and Ponka word for sugar as Ja^a-ni, Ja^a being wood or tree; ni, water or sap; thus, tree sap. The word for sugar maple is Ja^a-nihi, hi being tree or stock. The Kansa word also is Ja^a-ni; the Osage, Ca^a-ni; the Iowa, Na^a-ni, all apparently having the same etymology.

The Winnebago word differs somewhat, being Ta'niju'-ră, niju being water or rain. Hence the etymology would seem to be wood water or rain, the word apparently suggesting the idea of the rapid flow of the sap.

It would not be difficult, I believe, to bring forward much more linguistic evidence tending to show that the Indian names for sugar and maple sugar were usually the same, and that the terms for the latter were aboriginal, date from a remote antiquity, and were connected with the trees which produce their only saccharine. The evidence here advanced, however, seems to be sufficient. At all events, it appears to offer at least presumptive proof that the Indians were in nowise indebted to the European for their knowledge of maple sugar. Like the cultivation of the maize, the tobacco, the pumpkin, bean, and cotton alluded to above, the art of maple-sugar-making, simple as it was, was aboriginal, resulting from their own observation and inventive powers.

JIVĀYA STARINĀ (*Surviving Antiquity*).—In September-October of the current year the Ethnographic Section of the Imperial Russian Geographical Society will publish the first number of a quarterly with the above title. It will be devoted to the whole Slav race, wherever resident, and to the various ethnic stocks within the Russian Empire.

A FETISH-TOWN IN TOGOLAND.—“The great fetish-town, Dipongo, consists of nine huts, grouped in a circle round an india-rubber tree, and of these seven are occupied only by the wives and children of Jaopura. The fetish-hut shelters Jaopura's insignia as king and highest fetish priest of Adeli. Several gigantic parasols of native workmanship, covered with bright-colored European calico; a great, wonderfully carved Ashantee stool (the natives say Assanti) with bells, which he sends on ahead to every great assembly as a sign that he is going to appear in person; a remarkably wrought leather girdle, with iron bells sewed on in front, which none but Jaopura may wear; a barrel-shaped drum covered with leopard skin, which, unlike the other drums, is not beaten but stroked with the drum-stick, which produces a peculiarly rattling noise, and various other fetish and royal insignia dangle, covered with dust, from the walls and roof or stand sprinkled with blood upon the floor.

“Between his two huts a broad path, the beginning of which is marked by two sacred tree trunks lying obliquely across it, leads to the great fetish in the wood, which I was not allowed to approach. Here are held the great fetish festivals, while the ordinary ceremonies—in which the killing of chickens, from the nature of whose death struggles a favorable or unfavorable answer is given to the questioner, plays the chief part—are carried on in the village itself.” (Lieutenant Kling, commander of the Bismarckburg station, Togoland, in “Mittheilungen . . . aus den Deutschen Schutzgebieten, v. 3, No. 3, Berlin, 1890.)

SECRET SOCIETIES AMONG THE COAST INDIANS OF BRITISH COLUMBIA AND ALASKA.—The well-known Norwegian traveller, J. A. Jacobsen, is beginning to publish the ethnographical results of his travels in northwestern America, in “Das Ausland.” The first article appeared in Nos. 14 and 15 of the current volume (pp. 267–9, 290–3), and treats of secret societies on the northwest coast (“Geheimbunde der Kustenbewohner Nordamerikas.”)

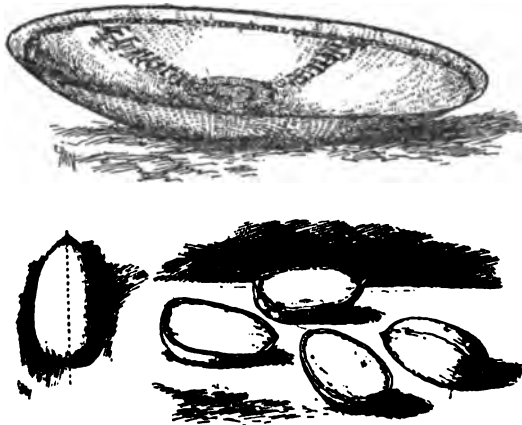
Captain Jacobsen describes four of these secret orders, namely:

1. The Hametz or “biters,” with three classes, the biters of men, the corpse devourers, and the dog biters.
2. The Pak-halla or Pak-kwalla, “medicine men.”
3. The Hatz-kwalla or self-torturers, peculiar to the Kwakiutl.
4. The Nuttle-mattla, who perform all sorts of buffoonery under the possession of the spirits.

**ON THE NISHINAM GAME OF "HA" AND THE BOSTON
GAME OF "PROPS."**

BY ROBERT E. C. STEARNS.

Stephen Powers,* in his description of the games of the Nishinam Indians of interior California, says: "The *ha* is a game of dice, played by men or women, two, three, or four together. The dice, four in number, consist of two acorns split lengthwise into halves, with the outside scraped and painted red or black. They are shaken in the hands and thrown into a wide, flat basket, woven in ornamental patterns, sometimes worth \$25. One paint and three whites, or *vice versa*, score nothing; two of each, score one; four alike, score four. The thrower keeps on throwing until he makes a blank throw, when another takes the dice. When all the players have stood their turn, the one who has scored most takes the stakes, which in this game are generally small, say a "bit." As the Indians say, "This is a quick game, and with good luck one can very soon break another."



Fifty years ago a similar game was played by boys in Boston with dice made of the money-cowry, *Cypræa moneta*. The shells to the

* Contributions to N. A. Ethnology, Vol. III, p. 332, 1877. U. S. Geog. and Geol. Survey, &c.

number of four were selected as nearly as possible of the same size, and the backs ground down so as to expose the interior. The cavity thus made was filled with *red* sealing-wax. The game was known as "*props*" and the count was the same as in the Nishinam game with acorns, as described by Powers. The shells as prepared, or "*props*," were shaken in the hand and dropped or cast from the hand with a somewhat twisted motion of the wrist, so as to scatter them a little. When thrown, if the props turned up two sides one way and two the other, or two and two, the count was *one*—this was called a *nick*; if all four came the same side up, the count was *four*, and was called a "*browner*;" if the shells or props fell *three* one side and *one* the other, it was called an "*out*," and the props were passed to the next player. The props continued with the same player until he made an *out*, and the *number* to make a *game* was agreed upon, before the playing commenced.



Occasionally, when the playing or throwing was on the ground, a shell would stand or lodge on one edge; this was called a "*cock*," and the player was allowed to keep on, the "*cock*" not counting one way or the other, to his advantage or detriment.

The game of *props* was played by boys for marbles; subsequently it became an out-and-out gambling game and was played by men for money.

Cheating in this simple game was made possible and was practiced by filling the cavity, first with a portion of sealing-wax, then with some *lead*, then finally with wax, which concealed the *lead*. With these so-called loaded props the player could make a winning throw nearly every time.

Professional gamblers carried two sets of props the better to deceive their victims, and substituted a loaded set for a fair or not loaded set as opportunity permitted. Gambling by professionals

with props became so common at one time that the law intervened and the game and its implements were made unlawful and prohibited.

When we consider the fact that the Nishinam game of "*ha*" and the white man's game of *props* are one and the same, differing only in the character of the dice and in this respect only in the material or objects of which the dice were made, the question naturally arises whether the games so played had a common or separate origin.

It will be noticed that the time referred to, of prop playing in Boston, was many years before the great migration to California, in 1849, following the discovery of gold at Sutter's Mill, by Marshall, in 1848.

Returning to the questions, Did the pale faces of the Atlantic side learn the game from the red men of the west coast, or *vice versa*? Did the little invention have a separate and independent birth in each of these widely remote regions?

The fact of commercial intercourse between the people or individuals of these regions fifty years before the prop-playing date in Boston warrants the deduction that the knowledge of the game was borrowed of one party from the other, and also argues by implication against the presumption of independent origin.

On the fifth of June, 1791, we are told, the ship *Columbia*, from Boston, Mass., Captain Robert Gray, arrived on the west coast at a place called *Clyoquot*, near the entrance to the Straits of Fuca, and traded up and down the coast during the following spring and summer. It was while on one of these trading excursions to buy furs from the Indians that Captain Gray, on the 7th of March, 1792, discovered the Columbia river, which he named after his ship, the first that ever sailed up its stream. The report of this discovery and the valuable collection of furs Captain Gray carried to Boston created considerable excitement, and a number of expeditions were planned for making a settlement on the western coast.

It would occupy too much time and space to recite in detail the various ventures, expeditions, and vessels which followed the lead of the *Columbia* in the fur, hide, and tallow trade from 1791 to 1840, or to specify the various points touched at by the numerous vessels from Boston and vicinity during what may be called the first period or era of west-coast trade. In Dana's "Two years before the mast" we have an entertaining description of some of its

characteristics. Incidental to this early intercourse and traffic with the Indians, the pursuit of fur-bearing animals and the purchase of peltries led trappers and traders into the interior of California and the valleys of the Tulare, San Joaquin, and Sacramento, which in those days, as we are told, abounded with beaver, otter, and other animals.

Without seeking further to inquire whether the game of *ha* was played by the Indians of other tribes than the Nishinams, as specially mentioned, which is not improbable, it will be perceived that there was direct contact between the white men of the east and the California Indians of interior localities within the general region inhabited by the Nishinams and geographically related tribes.

The fur, hide, and tallow trade, in which Boston led the way, was largely controlled by its ships and ship-masters for many years, and this traffic was so generally identified with the vessels and men from that city that Americans, if not white men generally, were known as and were called "Bostons" by the Indians of the northwest—a name which is so applied to a limited extent along the coast even at the present day.

It is presumable that the game of *ha* was peculiarly a game of the interior Indians, for we may assume, with some show of reason, that if known or played by the coast tribes the latter would have used *some form of shell* for dice *instead of acorns*, and though not the shells of the money-cowry, which is an Indo-Pacific species, yet the always available "kol-kol" shells, *Olivella biplicata*, which were so extensively used for other purposes, could always be picked up on the beaches.

If the Indian had learned the game of the white man, then the coast Indians would have been the *first* to have learned it, and we have nothing to show that the maritime or littoral tribes had any knowledge of it.

The year 1791 was on the west coast made still further notable by the beginning of the sperm-whale fishery. In that year six vessels sailed from Nantucket and one from New Bedford, and this fishery and the incidental intercourse with fur traders and the "hide droghers," as the vessels engaged in the hide and tallow trade were called, continued for many years.

The whaling vessels often remained one or two years on a cruise, and during this period were frequently obliged to put into some port or to touch at some of the islands for fresh meat, vegetables,

water, and fuel. For many years after the sperm-whale fishery was at its height, Honolulu was the chief and general refitting and replenishing place; other groups and islands in the Indo-Pacific waters were sometimes visited. At these places and on such occasions the sailors amused themselves by collecting on the beaches or among the reefs, or obtained from the natives for some trifle—a plug of tobacco, perhaps—sea shells, conchs, cowries, &c., and other so-called curiosities. New Bedford, Nantucket, Provincetown, etc., were the chief sources from which the older collections in the museums and private cabinets were supplied. My own cabinet, commenced at the age of seven years, contained many of the shells of the coast of California and from the Pacific islands that had been brought from these regions by the hide ships and whalers.

Of the various shells inhabiting the Indo-Pacific islands, none are more common or abundant than the money-cowry, of which the props were made.

We may assume that as acorns were not available at sea, unless a stock was obtained from the natives expressly for the purpose, that some substitute would be found and used, and that such substitute would be some natural form, easily manipulated and conveniently at hand; and, further, that the more intelligent white man would improve upon the simple implements of the savage when he could do so with less trouble to himself than would result from exactly or specifically following the forms used by the Indians. The common familiar money-cowry furnished a ready substitute for the acorn, and the red sealing-wax, then in common use, an available substitute for red paint.

The foregoing, it will be seen, carries the implication that the whites learned the game of *ha* from the Indians. To sustain this view we may farther assume, and it seems to me reasonably so, that if the red man had learned the game from the white man the latter would not have been slow in playing it for all it might profit him in winning from the Indians anything the latter might possess that was of any commercial value; and we might expect to find some evidence of the white man's superior implements among the red man's possessions.

It may be noted in passing, as a matter of peculiar interest if not of importance, that no instance of the occurrence of any form of Indo-Pacific shell has been detected among the Indians of the west coast, or among the trinkets, etc., in Indian graves.

It may be remarked that the questions before presented are inferentially answered by what immediately precedes this, to the effect that the pale faces or "Bostons" learned the game of *ka* from the Indians of the west coast, and this also answers the question as to a separate and independent birth.

Another point bearing upon the question in a general way is this: the game of *props*, so far as I can learn, was restricted to a very limited area, viz., Boston and vicinity and that region around the coast of Massachusetts which had the monopoly or control of the west-coast fur, hide, and tallow trade and the sperm-whale fishery of the North Pacific waters.

In the solution of questions of this kind it would seem that an answer may sometimes be found by pursuing the same method that is found to be generally satisfactory in determining the relations or identity, say, of fluviatile molluskan forms; the locality or habitat of the specimens in hand being known or having been ascertained, then to trace out and follow up the drainage system to which said locality or habitat belongs or in which it is situated. Now, between the Pacific coast and the Atlantic seaboard a continuous stream of intercourse was in operation and its movement continued for about fifty years and prior to the great migration of 1849 and '50. This stream included a width extending from the Straits of de Fuca at the north and southerly to San Diego, a reach of over twelve hundred miles on the west coast, with tributaries or minor streams extending into the interior, while its debouchment on the Atlantic side was confined to the limited region heretofore stated.

NATIVE RACES OF THE PHILIPPINE ISLANDS.—Prof. F. Blumentritt has recently published an annotated nominal list of the native tribes of the archipelago, with an excellent colored map showing their distribution. He recognizes but two distinct races on the islands, the Malay and the Negrito.

Prof. Blumentritt states that in the extensive literature relating to the Philippine Islands there has heretofore appeared no comprehensive list of the races which populate the archipelago, owing to the fact that the attention of travellers and students has been chiefly devoted to the island of Luzon and the Visayas, to the neglect of Mindanao and Paragua. ("Las Razas indigenas de Filipinas," Boletin de la Sociedad de Geografia de Madrid, v. 28, No. 1, pp. 7-42, March, 1890.)

ABORIGINAL FIRE-MAKING.

BY WALTER HOUGH.

Twenty years ago Paul Broca remarked: "These three distinct things must not be confounded—the knowledge of fire, the means of utilizing it, and the means of procuring it."* This caution was addressed to students of primitive society, in reference to which theories have originated based on observed facts of development. The above order seems to be the logical one, but demonstration is possible only in the two latter stages.

The first stage is theoretic only; for no tribe has ever been found ignorant of the use of fire, and the Andamanese, who are in the stage of fire preservation, are the only people the writer has been able to discover unacquainted with some method of generating fire at will.†

Numerous fire-origin myths have been collected from peoples of widely different culture. Nine-tenths of these myths relate that fire was brought down from above, or from a place where it was monopolized by the cunning or theft of some man or zoö-morphic hero. It is presumed that all fire-origin myths refer to the invention of some process to make fire easily. It is only necessary to mention the Prometheus myth as a type.

Many myths afford clues to the earliest apparatus for fire-making. Prometheus brought fire from heaven in a hollow reed. The cognate Hindu myth is more explicit, relating that the carpenter ground out fire from wood, and gives details of the compound machine used, which latter is found in every Hindoo temple. Kuchiya-Tama drilled fire from wood in early Japan; in China Suy-jin was the culture hero; Genos of the Phenicians taught men to make fire by wood friction, and so on through the list.

An addition to this body of evidence may be cited that carries the use of the simple drill farther back than probably any myth. Dr. Cyrus Adler, of Johns Hopkins University, has called my attention to the probability of the existence of the fire-drill among the non-

* *Societe d'anthropologie*, Bulletins, 2 s., V. 1870, p. 76.

† E. H. Man. *The Andaman Islanders*. Lond., 1883, p. 82.

Semitic aborigines of Babylonia. Prof. A. H. Sayce in the Hibbert Lectures* states that fire was produced in Babylonia, as in other countries of the ancient world, by rubbing two sticks one against another. Dr. Adler is inclined to think that the matter can be more definitely stated. The Akkadean word for fire god is *Gibil*, compounded of *gi*, which means reed, and *bil*, fire. This composition of the name points to the existence of a fire-making apparatus among the aborigines of southern Babylonia, of which the reed, *gi*, forms a part. This may have been used as a part of an upright drill like the Piute specimens collected by Major Powell, or after the manner of the Malays, by sawing one piece across another.

The following is a classification of the chief methods of fire-making by friction based upon the presumed order of development:

- | | | |
|--|---|---|
| I. On wood (reciprocating motion) by— | { | 1. <i>Simple two-stick apparatus.</i>
Indians of North, Central, and South America; Ainos, Japan; Somalis, Africa; most Australians, &c. The most widespread method.

2. <i>Four-part apparatus: mouth drill, and two-hand drill.</i> Eskimo, some Indians, Hindoos, and Dyaks.

3. <i>Compound, weighted drill.</i>
Iroquois and Chukchis. |
| II. On wood (sawing motion) | } | Malays and Burmese. |
| III. On wood (plowing or planing motion) | } | Polynesians; some Australians. |
| IV. Of minerals. (Percussion) | { | 1. <i>With pyrites (or stone containing iron) and flint.</i> Eskimo and Indians of the North (Algonkian and Athapascan stocks).

2. <i>Flint and steel.</i> Modern and disused methods and appliances. |

Besides the lens, mirror, and aerophore† there are pyrophores, the hydrogen lamp, matches, and various chemical and electrical methods that are beyond the scope of this paper.

There is a prevalent belief that to make fire by friction of two sticks is very difficult. Such is not the case. The writer can make fire in 10 seconds with the twirling-sticks and in five seconds with

* Origin and growth of Religion as illustrated by the Religion of the Ancient Babylonians, London, p. 180.

† American Anthropologist, i, 1888, p. 294.

the bow-drill. Captain John G. Bourke, U. S. A., furnishes corroborative testimony on this point* to the effect that the Apache can generate fire in less than 8 seconds. Most tribes make fire on wood in less than two minutes; if a longer time is consumed, it is probable that the people under observation are not properly prepared, or are practicing a waning art.

Generalizations with respect to fire-making have been made from the theoretical difficulties presented without recourse to a practical test. An experiment is a question put to nature, a fact which should not be forgotten by anthropologists as well as physicists.

The origin of the *culte de feu* is based on these theoretical considerations. "The difficulty, the impossibility almost, for certain tribes to produce fire for themselves makes it necessary to jealously preserve it; there is then nothing astonishing in the fact that it was respected and adored; and the appointment of Vestals charged with its preservation comes without doubt from the same idea." This is a late utterance by Sir John Lubbock.† It was adored, no doubt, as were other natural forces, because of its mysterious nature and origin. To its sacred and religious character, and not to the difficulty of procuring it, is due its preservation by special functionaries in a later stage of culture. The Vestals would have had no trouble to rekindle their fire. It was not their custom to moisten the sticks as does the Zuffi priest, according to Mrs. Stevenson, before making his sacred fire, possibly on the principle that what costs most is most valuable; or, more probably, because sacred fire must not be procured by the common method. Neither Eskimo nor Indian is careful to preserve fire, since a new spark can be obtained in half a minute. These tribes are far removed from primitive man, but it appears probable that when early man once learned the art he could obtain fire at will.

The retention of the wooden apparatus for so long a time among the different peoples is an interesting fact. In the case of many tribes familiar with quicker methods, this survival has doubtless resulted from religious influences. In several instances the green-corn dance, a cultus ceremony of our Indians, has brought the art down to our day, when otherwise it might have been lost. It is well known, too, that fire generated from wood is esteemed more efficacious by semi-cultured peoples. The reason for this belief

* American Anthropologist, iii, 1890, p. 61.

† A Conference upon the Savages. Toynbee Hall. London, 1887.

may be found in the respect and reverence for old customs—ancientism. The art has also progressed and there have been improvements in the apparatus, selection of wood, tinder, etc. No doubt fire can now be made more easily and in a shorter time than formerly.

Many travellers testify that they have observed various peoples make fire afresh by friction with sticks of wood. The most common way, by twirling one stick upon another, is well described by Pere Lafitau*: "The Hurons, the Iroquois, and the other peoples of North America do not make fire from the veins of flint, but rub two pieces of wood, one against the other. (Fig. 1). They take two pieces of



FIG. 1.—Simple two-stick fire-making apparatus.

cedar wood, dry and light; they hold one piece firmly down with the knee, and in a cavity which they have made with a beaver tooth or with the point of a knife on the edge of one of these pieces of wood, which is flat and a little larger, they insert the other piece, which is round and pointed, and turn and press down with so much rapidity and violence that the material of the wood, agitated with vehemence, falls off in a rain of fire by means of a crack or little canal which leads from the cavity over a match (of frayed cedar bark). This match receives the sparks which fall and preserves them for a long time and from which they can make a large fire by touching it to other dry materials."

Even the best descriptions, however, omit details essential to the

* *Moeurs des Sauvages Américains*, 1724, vol. ii, p. 242-3.

success of the process. Few note, for instance, the great knack in twirling the stick. It is held between the palms of the outstretched hands, which are drawn backward and forward past each other almost to the finger tips, giving the drill motion, and at the same time a strong downward pressure is given. The hands, of necessity, move down the spindle; when they nearly reach the lower end they are quickly shifted to the top without moving the drill from the hole, and rotation is repeated as rapidly as possible. Very shortly a light-colored wood powder is ground off by the point of the drill and collects in the slot, Lafitau's canal. Soon the powder increases in quantity and begins to get darker; the smell of burnt wood is

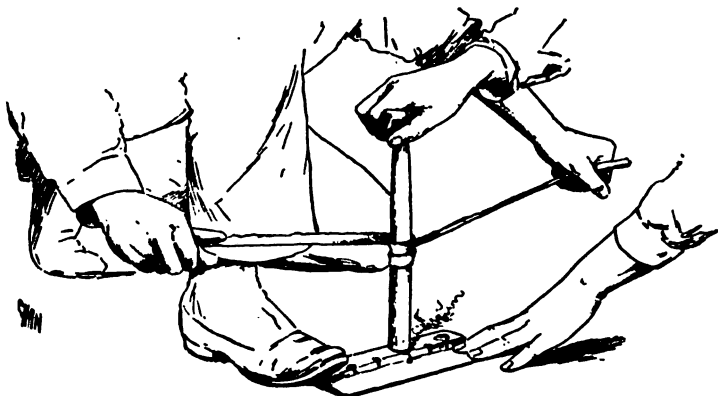


FIG. 2.—Eskimo two-handed fire drill.

speedily noticed and then smoke is seen. Probably when the next motion ceases there will be a little curl of peculiarly colored smoke, which shows that active combustion has begun. The mass of wood powder may now be shaken out of the canal.

At first it looks dead were it not for the thin line of vapor that comes from it. Gradually the fire spreads through it until it glows.

This semi-carbonized dust seemingly acts as a muffle to retain the increment of friction-heat until it attains 450° or higher. The dust must remain in an undisturbed heap; it is impossible to make fire without observing this caution.

In the case of the Eskimo compound drill the actual operation is similar to that in the simple drill described; the only difference is in the details of the mechanism which mark it as an improvement on the earlier form. (Fig. 2).

The Eskimo compound drill is of two varieties—one worked with a thong and hand-rest by two persons (Fig 2), and the other worked by one man with the aid of a bow and mouthpiece (Fig. 3). The apparatus consists of four parts, viz: the lower piece or hearth,



FIG. 3.—Eskimo mouth fire drill.

which may have fire-cups on the sides with a canal opening upon a flat step, or the holes may be bored on a central groove; the spindle; the mouthpiece or hand-rest with a stone bearing; and the cord which may be stretched on an ivory bow, or fitted with two

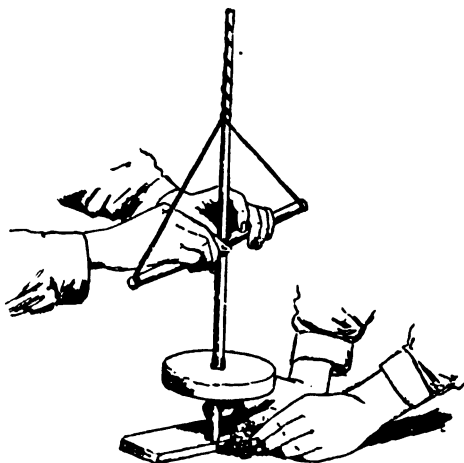


FIG. 4.—Iroquois pump-drill for making fire.

handles as the cord on the ancient Hindoo fire-drill. The bow and mouthpiece are not found south of Norton Sound, Alaska; the cord and hand-rest are exclusively used. At other points both

methods occur. The stepped variety of hearth also is found only in Southwestern Alaska, while the central holes on a groove are found from Labrador to Norton Sound, exclusively, and occurs, associated with the other, at the extreme southern range of the Eskimo.

The pump-drill (Fig. 4) is one that was used in making new fire in the white dog feast of 1888 by the Onondagua Iroquois of Canada. They are usually made of elm wood, and often the spindle was hewn from part of a sapling with its tap root forming the lower part. A mass of wood was left for a weight.

Mr. Wallace describes the sawing method thus: "A sharp-edged piece of bamboo is rubbed across the convex surface of another piece on which a small notch is first cut. The rubbing is slow at first and gradually quicker till it becomes very rapid, and the fine powder rubbed off ignites and falls through the hole which the rubbing has cut in the bamboo." * (Fig. 5).

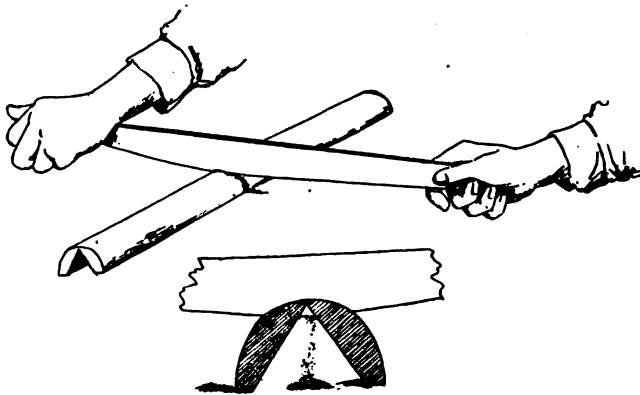


FIG. 5.—Fire saw. Section.

Two varieties of sawing have lately come to the writer's notice, one of which has marked a new locality in the distribution of this phase of fire-making. It has heretofore been observed at five points, viz: Among the Tungaras of British North Borneo (Daly), the Javanese (d'Almeida), the Karens and Chittagong Hill tribes of Burma (Dr. Luther and Mr. Lewis), the Malays of the islands (Wallace), and in Australia (Smyth).

*The Malay Archipelago. New York (1869) Harper's, p. 332.

It has lately been practiced at the village of Ubumkara in S. E. New Guinea. Mr. H. O. Forbes writes: "The operator first selecting a dry fragment of wood makes in it a split in which he inserts a peg to keep it agape; into this split he places a morsel of tinder plucked out of his girdle or skirt; he next cuts from his dry coil of rattan a short length, lays it on a dry leaf on the ground and places over it the tinder plug in the cleft stick; then placing his knee or foot on the end of the stick he pulls the rattan cord rapidly to and fro under it till the tinder ignites, when, by blowing gently through the cleft, he fans the spark into a flame. The whole operation is the most effective and rapid of any native fire-producing contrivance that I know."* Mr. Forbes' account is perhaps the first that has ever been published.

Mr. S. B. J. Skertchly describes another variant of the fire-sawing process in which the parts of the usual apparatus are reversed. The saw is set up on the ground and the convex side of a bamboo piece that bears a groove with a hole that communicates with the tinder placed on the upper concave side is slid rapidly along the edge of the saw. This is the common way among the Cagayu-sulu. The usual method, in which the sharp-edged saw is rubbed across a piece of bamboo, is practiced in Sulu, Perak, Selangore, and other places.†

This gives a distribution throughout the East Indies, beginning at the Asiatic continent and finding its way into Australia probably by Cape York. It will doubtless be found in the Malay Peninsula, Sumatra, the Celebes, and perhaps to the north in the Philippines. The writer was informed in 1889 that the sawing method is practiced also in Siam. The method is called the Malay or sawing method‡ and the type was founded on Wallace's description. It seems to be coincident with Malay influence. While there is little data to disprove this statement, it seems strange that the method was not carried further east by the Malayo-Polynesian wave of migration. The range of bamboo would seem to determine it, but both in Burma and Australia we find the parts of the apparatus cut out of wood.

The Polynesian islands are characterized by the plowing method of making fire, a variety of which is found also in Australia.

* Proc. Roy. Geog. Soc., XII, p. 562.

† J. Anthropol. Inst. XIX, 4, May, 1890, p. 456.

‡ Smithsonian Report, ii, 1888-9, p. 569.

The plowing method (Fig. 6) as practiced in Samoa was described for the writer by Lieutenant W. I. Moore, U. S. N. The Samoans prepare a short cylindrical pointed stick and a larger billet of wood, on which a shallow groove is sometimes begun. The smaller stick is clasped between the hands at an angle of 45° and projected to and from the body along the groove in the lower piece on which the native kneels. At first he forces it along a range of 6 or 7 inches, till the wood begins to wear away and is pushed into a little heap at the end of the groove; then he gradually accelerates and moves with a shorter range until, when he moves the stick with great rapidity, the brown dust ignites.

The flint and pyrites strike-a-light is used somewhat as the flint and steel, with which process most persons are familiar.



FIG. 6.—Samoan fire sticks.

Examination of many specimens of wooden fire apparatus shows that both the drill or upright, movable piece and the hearth or or lower piece are made of dry, inflammable wood, and, contrary to the common belief, quite often of pieces from the same tree. Wood that is "punky"—that is, soft from dry rot or worm-eaten—is preferable. This is the kind of wood spoken of by Festus and used by the Vestals: "*Mos erat tabulam felicitis materiæ tamdiu terebrare quousque exceptem ignem cribro ænis Virgo in ædem ferret.*" "It was the custom to bore into a plank of combustible wood upon which they had hitherto made fire, which a Vestal virgin received on a brazen sieve, which she carried immediately into the temple."*

* Festus: *Ignis vestæ*.

This kind of wood is not only easier of ignition, but it is ground off easily and more readily retains the heat generated by friction. In strong, skillful hands, however, fire can be made from wood that does not wholly meet these conditions, but there will be more failures than successes.

Woods vary widely in combustibility, depending perhaps on their density, coloring matter, or chemical constitution. For instance, it is practically impossible to make fire of black walnut; while dry, soft white maple, not decayed, is good for the purpose when drilled with the bow. The vascular, starchy, flowering stems of plants have always been favorite fire-generating material.

The Eskimo make use of nearly every kind of dry wood, because the compound drill enables him to give strong pressure with high rate of speed, thus generating enough heat to ignite wood that is quite intractable by the simple two-part drill. This invention followed from the conditions of the Eskimo's frozen home, where driftwood is his main dependence and choice is restricted. The Eskimo, however, always selects the best wood at hand, thus showing that he appreciates the advantages of proper material.

The flint and pyrites method is thought to compete with the twirling sticks for priority of invention. The antiquity of the latter has been set forth. By one theory its distribution is interpreted to mean that it was the heritage of the human race before it separated into groups. By the other theory it was rediscovered many times—a natural suggestion, for the materials are always at hand. The flint and pyrites method seems to be indicated by the few lumps of pyrites found in prehistoric stations in England and on the continent. However, it cannot be affirmed that the pyrites so found was used for fire-making. In this connection it would be of interest to know whether a piece of pyrites and scraper-like piece of flint have ever been found close together in conditions implying remote antiquity.

The strongest argument against the use of the pyrites method in a very primitive state of society is that it presupposes the selection, preparation, and preservation of tinder. Wooden fire-sticks, on the other hand, form their own tinder. In the pyrites strike-a-light the sparks are struck off at so low a heat that they will not inflame any except very "quick" tinder. With good tinder, however, the pyrites method is more expeditious, while the apparatus is more compact, and hence is an improvement following the line of elaboration.

Apparently preceding the flint and pyrites in the usage of several tribes is the method of striking two pieces of pyrites together, said to have been practiced by the Arctic Eskimo of a few localities.

Another origin of fire-making has been discussed. It is stated by several writers that while working flint a spark may have fallen into dry material, and that in this manner early man received the suggestion of fire-making. But the sparks produced by knocking two pieces of flint together will not, to the best of my knowledge from experiment, inflame tinder.

In view of the foregoing facts, it may be said with regard to the probable origin of fire-making: 1. That the selection of two sticks of wood for fire-making is more probable and natural than the use of iron-stone and flint. 2. That fire-making by means of sticks is easy, and hence probably came first in order of time. 3. That the pyrites method is more complex, and hence by the laws of invention comes later. It is unnatural that an expeditious mode of kindling fire afresh by flint and pyrites should have been supplanted by a less facile method. Inventions do not retrograde. Numerous cases may be cited where flint and steel have superseded the fire-sticks, but none show the opposite order of procedure. Dr. Tylor concludes: "To sum up now in a few words the history of the art of making fire, it appears that the common notion that the friction of two pieces of wood was the original method used has strong and wide-lying evidence in its favor, and that very little can be alleged against it."*

Apparently the Polynesian plowing method and the sawing method illustrate the most simple forms of friction apparatus. A plausible supposition bearing on this plan is that man got the hint from nature by observing the rubbing of two dry branches in high winds. The Polynesian method has the following in its favor: With one stick a furrow can be plowed on another without the intervention of a knife or other tool to cut a groove or a hole in which to start a drill, and hence it may have been invented during the earliest times. Its very simplicity renders the tool more difficult to work; for, in a wind, fire-making would be almost impossible. Again, when the dust collects at the end of the groove, the violent movements at the last moment are liable to scatter it. In the case of the rotary drill this is not so, the ground-off dust being kept in the canal. In the sawing plan, the preparation of the

* Early History of Mankind, p. 260.

knife, cutting the groove, placing the tinder underneath for draft, imply a more highly differentiated invention.

The rotary drill is the simplest aboriginal fire-making apparatus. Major Powell's three stages of culture may be defined by the kind of fire-apparatus used: 1. Savages make fire with two pieces of wood; 2. Barbarians with flint and steel or pyrites; 3. Civilized man by chemistry.

Since writing the foregoing the author has read Mr. Sidney B. J. Skertchly's paper on "Fire-making in North Borneo," in the May number of the Journal of the Anthropological Institute of Great Britain and Ireland.

In this communication the first complete description of the *besi api* or fire-syringe is given; the names of the parts, the moulds used in casting the cylinder, the measurements, etc.

All the natives of this part of Borneo use the well-known fire-drill. Mr. Skertchly has noted an essential point in the lower member of this appliance—the groove cut down the edge to collect the dust in which the fire rises.* Prof. A. C. Haddon, in the discussion following this paper, pointed out that the slot cut in the drill hole was not made by the Torres Straits Islanders, nor by the natives of Queensland, and therefore is not essential. Professor Haddon is right, in a sense. Fire *can* be made on a plane surface, without groove, but the difficulty is so great that it is almost prohibitive, and the slot is essential to quick and easy fire-making.

The writer has made fire without the slot, but finds it necessary to employ the compound drill, and to keep the parts from binding or jarring. He has rarely seen pieces of fire-making apparatus without the slot, groove, or a substitute for it. One of these was a model of a Hindoo sacred fire-drill, sent from Oxford Museum to the United States National Museum by Mr. Henry Balfour. The Victoria drill figured in R. Brough Smyth's great work,† has fire-cups directly on the edge of a rounded piece, so that when the drill begins to cut the wood-meal falls down over the edge in a heap as in the slot. Often connecting holes perform this important office.

A spindle of large diameter, with the outline of a low, flat arch (Tudor arch) at the abrading end, will not disturb the ring of dust that forms around its circumference (the difficulty with the unslotted

* See Smithsonian Report, ii, 1888, p. 557.

† The Aborigines of Victoria, i, p. 393.

hole), and if the ignition point is reached before the spindle cuts very deep, the experiment will be successful. This sort of drill has to be worked by a cord or bow.

Those who have previously written on this subject are to be pardoned, because they had no knowledge of the exigencies of the process and the minute particulars required. Drawings also were not accurate in the small points which were left to the artist. I have known professional draughtsmen to omit the slot from a drawing of a fire-drill. This has doubtless often led to misconceptions as to the position of the fire-hole.

Mr. Skertchly carefully describes the sawing method and notes an interesting variation.

Fire is sometimes made in Borneo by striking a bit of broken crockery on a bamboo, which requires great skill.

A plate of excellent figures accompanies Mr. Skertchley's article, and his paper was illustrated by a series of photographs taken by Mrs. Skertchly, showing the methods of obtaining fire from the instruments described. Several drawings of fire-syringes were also exhibited by members of the institute. In the discussion, the veteran Dr. Rae gave an account of Eskimo fire-producing, which terminated this extremely interesting *seance*.

The above paper was read before the society January 4, 1890. In the course of his remarks Mr. Hough exhibited various primitive apparatus for fire-making which are contained in the National Museum collection and are illustrated above. From several of them he succeeded in creating a flame.

CANNIBALISM IN NEW IRELAND.—Cannibalism is still generally practised and freely acknowledged by the natives of the island of New Ireland, now called New Mecklenburg by the Germans, who have established a "protectorate" over it. Strangers—that is, people from a different village or tribe—only are eaten, and each person who partakes of the feast has to pay a certain sum of shell money to the owner—that is, the man who killed the "game." (Count Joachim Pfeil, in *Verhandlungen der Gesellschaft für Erdkunde zu Berlin* for March, 1890.)

CUSTOMS AND BELIEFS OF THE TRIBES OF SOUTH AFRICA.—A long and interesting general account of the ethnography of South Africa has recently appeared in the *Revue Scientifique* (" Coutumes et croyances des tribus de l'Afrique australe," par J. Macdonald. *Rev. Sci.*, v. 45, Nos. 21, 22, May, 1890, pp 642-8, 679-87).

This article, which appears to be a compilation, although the sources of information are seldom referred to, after giving a general sketch of the tribes dealt with, their names and social organization, proceeds to describe them in detail under the following heads: Birth and posterity; puberty, including the ceremonies of circumcision and initiation; marriage; sickness and death; property and inheritance; fire-making; food; hunting and fishing; agriculture; warfare; religion; oaths; salutations; arithmetic; measure of time; games and dances; magic and divination, and rain-making.

BUSHMAN ART.—G. Weitzacker sends to the bulletin of the Italian Geographical Society copies of some interesting examples of Bushman rock-paintings recently discovered by himself in Basutoland. These represent, first, a man milking, an eland grouped with four apes, two elands together (one of these is remarkably good), and a large group of eighteen figures representing a number of Bushwomen, with their children, flying from a party of Matabele Kafirs. This picture is full of life, and, according to Mr. Weitzacker, illustrates many important ethnographical details, which he describes fully in the text. (*Bollettino della Società Geografica Italiana*, April, 1890.)

"EXOGENY" IN NEW BRITAIN.—The natives are divided into two marriage groups, called "Maramara" and "Pikalaba." Marriage of two persons within one of these groups appears to be punishable with death to the woman and a heavy fine to the man. A person of one group can thus only marry one of the other, and the children belong to the mother's group.

Both groups show great reverence for an insect, a species of Mantis, and any one who should kill or injure one of these would be severely punished. (Count Joachim Pfeil in *Verhandlungen der Gesellschaft für Erdkunde zu Berlin*, March, 1890.)

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BOOK NOTICES.

Mehmed's Brautfahrt (Smailagic Meho): Ein Volksepos der süd-slavischen Mohammedaner. Aufgezeichnet von Dr. Friedrich S. Krauss. Deutsch von Carl Gröber. Wien, Alfred Holder, 1890. 16 mo., 130.

This is a German metrical translation by Captain Gröber, an officer in the Austrian army, of a epic poem of the Mohammedan Slavs of Herzegovina, taken down from oral recitation by Dr. Krauss, the distinguished South-slav specialist. Among the secluded valleys of the upper Balkan peninsula—as in the remote districts of Ireland and Scotland—there are still old men, the descendants of the bards and minnesingers of the middle ages, who keep alive the memory of the past by the recital of long heroic poems which have been handed down traditionally through centuries. Among the Slavs these poems are all in a monotonous decasyllabic meter, without rhyme, and the singer accompanies himself on a sort of guitar (*gusla*), whence the generic name Guslar songs (*Guslarenlieder*) applied to the compositions. They are frequently of great length—this particular one occupied six hours in the delivery—and end with a few comic verses having no connection with the subject of the poem itself and intended to put the hearers in a good humor. A wealth of such material exists in the peninsula. The old man from whom this was obtained claimed to know a hundred and fifty such poems.

Unlike most of its class, the story is told from the standpoint of the proselyted Slavs, who appear to have become as intensely Mohammedan as any of their Moslem conquerors. By careful research the translator has ascertained that the poem has for its historic groundwork an engagement between the Turks and Christians which occurred in 1657, at no great distance from Budapest, the capital of Hungary, which at that time was all in the hands of the Turks. Briefly told, the story is as follows: Mehmed, a young officer, is on his way, accompanied by a single attendant, to receive his commission from the Pasha of Budapest. They meet a party of soldiers in charge of a Mohammedan girl who has refused the hand of the Pasha, and is now by his orders to be sold as a slave to a general

of the hated Christians in Wallachia. Mehmed determines upon her rescue, and the two men fall upon the hundred soldiers and slaughter them in good old knightly style, secure the maiden, and return with her to her home in Budapest. She of course falls in love with her deliverer and agrees to marry him, when Mehmed compels the unwilling minion of the Pasha to draw up the marriage contract, and then sets out for the south to collect his friends to escort the bride in proper fashion to her new home. They return to the number of twelve thousand footmen and fifteen thousand mounted warriors and are received in Budapest with princely hospitality. The festivities last several days, when young Mehmed and his train start on the return home with his bride. In the meantime, however, the false Pasha has sent a letter to the Wallachian general advising him to assemble his forces and cut off the party. Mehmed advances to the bridge of the Klina, where he encounters the whole host of the Wallachians, who have already engaged his advance guard. A terrible battle ensues, lasting three days, with the result that the Christian army is cut to pieces and its general becomes a prisoner in the hands of his youthful rival.

The story is well told and gives a vivid picture of a period in the long struggle between Turk and Christian, still going on in the same region, when every man's trade was war, and life was a carnival of blood, rapine, and drunkenness.

JAMES MOONEY.

"Essai d'une classification des races humaines, basée uniquement sur les caractères physiques. Par M. J. Deniker."—[*Bull. Soc. d'Anthrop. de Paris*, xii, 1889, 320-336.]

The classification of mankind by race has not always proceeded upon the characteristics which truly constitute race. A familiar example is presented in the term Bantu for Africa and Algonkin for America. Every one knows that in the present state of ethnology these are linguistic words. Race, on the contrary, means blood. To our thinking, whenever and wherever a group of human beings have been isolated long enough to render a set of physical characters peculiar to themselves fixed and hereditary, then and there you have a race of men. In the modern commingling of our species incident to commerce a pure race is no longer possible; but many believe that it was not always thus. Between the pristine group and

the centripetal period of modern times there is believed to have been a long age in which centrifugal forces held sway, segregating men and fixing their characteristics. Furthermore, it is held by many, and among them by M. J. Deniker, that the modern period has not endured sufficiently long to obliterate the traces of these ancient pure races. Consequently, in the *Bulletins de la Société d'Anthropologie de Paris* (xii, 1889, 320-336), he lays down a new classification of the races of men based solely on physical characteristics. There are thirteen of these races, as follows:

- I. Bushman (Koi-Koi). Woolly hair, yellow skin.
- II. Nigritic. Woolly hair, black skin.
- III. Melanesian. “ “
- IV. Negrito. Frizzled hair, black skin, depressed nose.
- V. Australian. “ “ “
- VI. Ethiopian. “ “ “
- VII. Melanochroi. Wavy hair, skin brunette, hair black, eyes dark.
- VIII. Xanthochroi. Wavy hair, skin rosy, hair blonde, eyes light.
- IX. Uralo-Altaic. Straightish hair, skin white, lips thin, nose narrow.
- X. Aino. Straightish hair, skin white, lips thin, nose wide.
- XI. Indonesian. Straightish hair, skin yellow, lips fleshy.
- XII. Mongoloid. Straight, coarse, smooth hair, skin white-yellow.
- XIII. American. Straight, coarse, smooth hair, skin reddish-yellow.

The physical characteristics of each of the thirteen races are given, and the modern types under each race shown:

- | | TYPES. |
|---|--------------------|
| I. BUSHMAN. Yellow, short, steatopygeous | <i>Bushman.</i> |
| II. NIGRITIC. Wide nose, straight or flat; lips projecting, forehead bulging, divided into: | |
| a. Dolichocephalic, flat nosed, prognathic, and salient nosed, tall and little prognathic | <i>Negro.</i> |
| b. Brachycephalic, short | <i>Bantu.</i> |
| III. MELANESIAN. Nose turned up, large at the end, supraciliary arches prominent . . . | <i>Akka.</i> |
| IV. NEGRITO. Brachycephalic, short, hair meagre, | <i>Melanesian.</i> |
| | <i>Negrito.</i> |

TYPES.

- V. AUSTRALIAN. Dolichocephalic, short or medium stature, very hairy *Australian.*
- VI. ETHIOPIAN. Skin very brown, nose salient.
- a.* Tall, nose straight or aquiline *Bedja* (Galla, Foulbe, Nubian).
- b.* Short or medium stature, nose retreating *Dravida.*
- VII. MELANOCHROI.
- Mesocephalic, straight nose, medium height. *Indo-Atlantic or Aryan.*
- Dolichocephalic, nose curved, pointed, aquiline, occiput prominent *Arab.*
- Dolichocephalic, nose straight, narrow at the end *Berber.*
- Brachycephalic, nose hooked, narrow at the end, hair much frizzed and abundant *Assyroid.*
- Brachycephalic, nose straight, fine or at times retroussé ; short of stature *Rhetian or Celto-Ligurian.*
- VIII. XANTHOCHROI.
- Dolichocephalic, tall, hairy *Norse or Kymri.*
- Brachycephalic, medium stature, little hair *Karelian.*
- IX. URALO-ALTAIC.
- a.* Nose retroussé, hair blonde *Souomi.* (W. Finns).
- b.* Brachycephalic, brown hair *Lapp.*
- c.* Mesocephalic or dolichocephalic, nose straight, gross *Ugrian* (Ostiak-Samoyède).
- d.* Brachycephalic, nose straight, gross, *Turk* (Turanian).
- X. AINO. Wide nose, very hairy, dolichocephalic, *Aino.*
- XI. INDONESIAN.
- a.* Hair quite wavy, skin olive brown *Polynesian.*
- b.* Hair quite straight, skin yellow-brown *Malayo-Indonesian.*
- XII. MONGOLOID.
- a.* Brachycephalic, nose narrow, fine face, round, medium height *Mongol.*
- b.* Brachycephalic, nose gross, face elongated, medium height *Tungus.*
- c.* Dolichocephalic, face round, short *Eskimo.*

XIII. AMERICAN.

TYPES.

Brachycephalic	{	Nose aquiline, tall or medium height . . .	<i>Red Skin.</i>
		Nose straight or curved a little, short of stature .	<i>Indians of the South.</i>
	{	Nose straight or curved a little, tall . . .	<i>Patagonians.</i>
Dolichocephalic.		Nose straight, frequently retroussé, short . . .	<i>Paleo-American (Fugian-Botocudo).</i>

M. Deniker has worked out the system with great elaborateness. It should be compared with those of Welcker, Friedrich Müller, Haeckel, Topinard, Flower, and especially with Keane's classifications in Stanford's Compendium, Chambers' Cyclopædia, and in his criticisms of ethnographic volumes in *Nature*.

O. T. MASON.

COLLECTIONS OF THE MISSOURI HISTORICAL SOCIETY.—Among the many valuable collections of archæologic material in this country is that preserved in the Missouri Historical Society rooms at St. Louis. This series of objects is especially rich in implements of chipped stone, obtained mainly from the middle region of the Mississippi, with St. Louis as a center. There are eight or ten thousand specimens of this class and these have been culled from at least ten times that number. They were brought together mainly through the efforts of Mr. O. W. Collett, the present custodian, whose appreciation of the requirements of science in such matters has given them exceptional value. Very many were collected by his own hands and nearly all are supplemented by records of locality and manner of occurrence. They are therefore not an assemblage of strays, that serve only to perplex the student, but constitute a body of scientific material valuable now and available to future generations.

Much of the value of this collection and of the success of the Society are due to the intelligent direction and generous assistance of Col. Geo. H. Leighton, president of the Society.

W. H. HOLMES.

NOTES AND NEWS.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.
—The American Association for the Advancement of Science met in the city of Indianapolis, August 19–26. The meeting was well attended, although it was observed that the large cities of the west were numerically but meagerly represented. The hospitalities extended by the city were most flattering and will long be remembered by the Association. The magnificent State-house was placed at its disposal and made a most satisfactory place of meeting.

The officers of Section H, Anthropology, were Dr. Frank Baker of Washington, Vice-President; Dr. Joseph Jastrow of Madison, Secretary; Dr. Charles C. Abbott of Philadelphia, Councillor; Prof. E. T. Cox of New York, Prof. O. T. Mason of Washington, and Mr. A. W. Butler of Brookville, Indiana, members of the Sectional Committee. The address of Dr. Frank Baker appears in this number of the *ANTHROPOLOGIST*. The papers read were as follows:

Indian Origin of Maple Sugar. By H. W. Henshaw.

Fort Ancient. By W. K. Moorehead.

Aboriginal Stone Implements of the Potomac Valley. By W. H. Holmes.

Suggestion for a Pan-American as Precursor to an Universal Language. By R. T. Colburn.

Dialectic Studies in the Swedish Province of Dalecarlia. By J. Muller.

Notice of a Singular Earth-work near Foster's, Little Miami Valley, Ohio. By F. W. Putnam.

Exhibition of Diagrams of the Brains and Medisected Heads of Man and a Chimpanzee. By Burt G. Wilder.

Peculiar Effects of One-sided Occupations on the Anatomy and Physiology of Man. By J. Muller.

Exhibition of a Bone Image from Livingston County, N. Y. By C. C. Abbott.

Exhibition of Gold Beads of Indian Manufacture from Florida and New Jersey. By C. C. Abbott.

A Study of Mental Statistics. By J. Jastrow.

Arts of Modern Savages for Interpreting Archæology. By O. T. Mason.

The Form of the External Ear. By H. D. Garrison.

Preliminary Steps to an Archæological Map of Franklin County, Indiana. By H. M. Stoops.

The Relation of Mind to its Physical Basis. By Edward D. Cope.
Remarks upon the Mounds of Sullivan County, Indiana. By J. W. Spencer.

On the Atlatl or Spear-thrower of Ancient Mexico. By Zelia Nuttall.

On an Ancient Hearth in the Little Miami Valley. By F. W. Putnam.

The Evolution of a Sect. By Anita Newcomb McGee.

On Obsidian Implements of California. By H. N. Rust.

The Basket-mortar of Southern California. By H. N. Rust.

The Adze. By H. N. Rust.

Besides the Vice-President's address the chief papers may be thus characterized: Mr. Henshaw took the ground, from a large study of the literary resources, that the Indians originated the art of maple sugar making. Mr. Moorehead has most carefully examined the old Fort Ancient and written a volume about it. The communication was a resumé of the work. Mr. Holmes gave an account of his explorations of aboriginal boulder quarries and work shops in the District of Columbia. This is the best account of such work we have had. Mr. Putnam gave an elaborate account of his last year's work on the Little Miami and in central Ohio. The occurrence of burnt clay in large masses, and in many varieties, is one of the greatest enigmas Mr. Putnam has encountered in his exploration. Professor Jastrow's paper was based upon the results obtained from a large class of young men and young women who were asked to write out extempore one hundred words. These lists compared and collected form the basis of Dr. Jastrow's studies in six trains of thought—mental idiosyncrasies, &c. Professor Mason's paper called attention to the absolute necessity of studying modern savages to get a proper conception of the data of archæology. Dr. Cope's discussion was based on his well-known theory of consciousness in evolution. The organism, on this theory, is rather the servant of the mental side of man than its creator and ruler. Following up the studies of Professor Mason on the Eskimo throwing stick, Mrs. Nuttall, with great patience, has worked out the ancient Mexican spear-thrower seen so frequently in the Kingsborough and other codices. Mrs. McGee gave a detailed account of the origin and history of one of the small religious communities or rather sects of our country.

The next meeting of the Association, and consequently of the Section, will be held in Washington, but the time has not yet been fixed.

O. T. MASON.

ORIENTAL CUSTOMS OF COURTESY.—In a valuable contribution to the July number of *THE AMERICAN ANTHROPOLOGIST* on "Customs of Courtesy," Colonel Garrick Mallery made allusions to the customs of the Arabs and the Israelites. I venture to offer a few remarks on this subject.

In ancient Israel the most common salutation was simply *shalom*, a word usually translated 'peace,' but carrying with it the general idea of 'welfare.' (See II Kings IV, 23 and 26.) It has been suggested, and the suggestion has much in its favor, that the passage relating to Joseph's brothers (Genesis XXXVII, 4), 'they hated him and could not speak peaceably unto him,' means 'they would not salute him.' In Judges (XIX, 20) and I Chronicles (XII, 18) the same form is employed. In I Samuel (XXV, 6) we find the expression 'to inquire after the peace' translated in the authorized version by 'to greet;' this is used when it is desired to indicate that the greeting was sent by a messenger or ambassador. The same phrase occurs frequently in the Assyrian inscriptions. A different form of salutation occurs in the book of Ruth (II, 4) where Boaz says to the workmen, 'The Lord be with you,' and they reply, 'The Lord bless thee,' (See also Psalm CXXIX, 7.) From a number of biblical passages we know that the salutation was accompanied by a profound obeisance.

Among the modern Jews where a Hebrew salutation is used it is generally the same as that of the Arabs, 'Peace be with you.' In the Sephardic (Portuguese) congregations the ritual salutation is that employed in the book of Ruth. Among the German Jews when a visitor entered the house the host greeted him with 'Blessed be he that enters,' to which the visitor replied, 'Blessed be he that is found.'

It may be worth noting that even now salutation in the East is a cumbersome affair. If two Arabs who are in a hurry approach one another and desire to talk on some matter of business, they will commence to shout to one another about their affairs when some distance apart. As soon as they actually meet they drop the business and salute.

Colonel Mallery stated that "Moslems, while scrupulously saluting the meanest of their own communion, refuse all friendly greeting to the Jews." This assertion is not quite correct. The usual Moslem greeting is, 'Peace be with you.' This may be offered only to a Moslem, and is denied all *kafirs*, whether they be Christians or Jews. The Moslem will, however, accost a *kafir* with 'May your

morning be good,' or, 'May your day be happy,' and will receive the reply, 'May your morning be happy and blessed,' or, 'May your day be happy and blessed.' I am not able to verify the statement that if a Moslem say by inadvertence to a *kafir*, 'Peace be unto you,' that he will add, 'Death to you.' I am also doubtful about the statement, "Where the Jews are in power they give no salute whatever to one of the Goim (non-Jews), but scowl at him." I have never heard of any community where this practice is followed; and the description "where the Jews are in power" is not sufficient to enable one to define the locality with any degree of accuracy.

CYRUS ADLER.

IROQUOIS SUPERSTITIONS.—When wampum belts were found wet and bedewed it was taken as an omen portending the death of a chief or sachem.

In the Council for Condolence and Installation, when the veil, composed of skin robes, was hung across the Extended House to divide the two international phratries from each other, and during the singing of the so-called "Six songs," if a chief or chiefs wept at the weird, touching lament, it was solemnly passed from mouth to mouth that the ones so affected would be the next in the body of councilors to die.

Healing herbs and "medicine" (anything of an U'-tke' or supernatural nature used as a charm or amulet) were not gathered in the season when fire-flies flourished, because witches and wizards went about in the dark emitting sparks of fire, and so it would have been difficult to distinguish one from a fire-fly. Moreover, if a wizard or witch saw any one gathering herbs or "medicine" without being detected, the virtues of the herbs were destroyed. The habitat of the medicinal plants would thus be discovered, and the plants would then be destroyed by the witches and wizards.

Disease or pestilence was said to be supernaturally subtle, monstrous, and *faceless*, being in collusion with all manner of evil spirits and daimons. The false-faces having wry-mouths were and are still invoked to aid in driving away disease and evil spirits. There are annual and special expulsions and exorcisms of sickness and daimons. In the Iroquoian Genesis-myth, Ha-tu'-i', who seems to have been the god of disease and death, promises, for sparing his life, to aid Earth-Growing in benefiting mankind in sickness if they would only take on his form and make a feast in his honor.

Small dogs, particularly those having a spot, commonly black or yellow, on each eyebrow, and causing them to appear to have four eyes, are said to be more subtle in perceiving the approach of witches or wizards than other kinds of dogs.

The howling of a dog portends a death in the family to which the animal belongs.

The continued barking or howling of a dog without apparent cause indicates the approach of a witch or wizard from the direction which the dog faces while howling.

A large, bright light seen on the roof of a house was said to be an omen that death would soon visit that house.

When the moon was in eclipse guns were fired, dogs urged to bark, and even beaten to cause them to howl, loud and continued shouting and wailings were kept up by the people, to frighten and drive away the mythic fire-dragon that was supposed to be swallowing the moon—the grandmother of the race of mankind.

When ducks and geese remained long in the water it was taken as a sign that there would be showers of rain accompanied by wind for three days.

If a rock or stone was found wet or bedewed with moisture it was a sign that rain would fall the next day.

If the houses of the muskrat were made thin it was a sign that the coming winter would be mild; but if they were lined a cold winter was predicted; if triple-lined a most severe and rigorous winter was expected.

If the deer pelts were thin and the hair on them was short a mild winter was indicated, and, conversely, thick skins and long hair indicated a severe winter.

If the bears began early to embed themselves in lairs well lined with leaves a long and severe winter was indicated.

After contact with a corpse a person would bruise the leaves of the common plantain (*Plantago major*), put them into water, and wash his eyes and face with the decoction in order to cleanse his eyes and face from the evil influence left by the ghost of the corpse, as it would not be well for a sick person or child to be seen by a person who had neglected the purification.

A small, white, perennial plant with yellow flowers is hung up in the house to ward off ghosts.

If it hailed much in the fall of the year it was said that there would be an abundance of all kinds of nuts and fruits the next year.

It is said that chipmunks are descended from snakes, and the common chimney swifts from crabs.

J. N. B. HEWITT.

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